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Ontario - Legislative Assembly

SESSIONAL PAPERS

VOLUME XXXVI.—PART V.

SECOND SESSION OF TENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

64296
3/4/05.

SESSION 1904.

TORONTO:
PRINTED AND PUBLISHED BY L. K. CAMERON,
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY.
1904.

LIST OF SESSIONAL PAPERS.

ARRANGED ALPHABETICALLY.

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No. 2 . . . Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature, 28th January, 1904. *Not Printed.* Estimates for the year 1904. Presented to the Legislature, 5th February, 1904. *Printed.* Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature, 29th March, 1904. *Not Printed.* Estimates (Supplementary) for the year 1904. Presented to the Legislature, 23rd April, 1904. *Printed.*

No. 3 . . . Report of the Commissioner of Crown Lands for the year 1903 Presented to the Legislature, 14th March, 1904. *Printed.*

No. 4 . . . Report of the Clerk of Forestry for the year 1903. Presented to the Legislature, 7th April, 1904. *Printed.*

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No. 8 . . . Report of the Inspectors of Factories for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 9 . . . Report relating to the registration of Births, Marriages and Deaths for the year 1902. Presented to the Legislature, 4th February, 1904. *Printed.*

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No. 13 . . Auditors' Report to the Board of Trustees, University of Toronto, on Capital and Income Accounts, for the year ending 30th June, 1903. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 14 . . Report of the Ontario Agricultural College and Experimental Farm, for the year 1903. Presented to the Legislature, 30th March, 1904. *Printed.*

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No. 16 . . Report of the Fruit Growers' Association of the Province, for the year 1903. Presented to the Legislature, 15th April, 1903. *Printed.*

No. 17 . . Report of the Fruit Experiment Stations of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed*

No. 18 . . Report of the Inspector of Fumigation Appliances of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 19 . . Report of the Entomological Society, for the year 1903. Presented to the Legislature, 14th March, 1904. *Printed.*

No. 20 . . Report of the Bee-Keepers' Associations of the Province, for the year 1903 Presented to the Legislature, 15th April, 1904. *Printed.*

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No. 21 . . Hand-book for the use of Women's Institutes in Ontario. Presented to the Legislature, 10th February, 1904. *Printed for distribution only.*

No. 22 . . Reports of the Dairymen's Associations of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 23 . . Reports of the Live Stock Associations of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 24 . . Report of the Registrar of Live Stock of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 25 . . Report of the Farmers' Institutes of the Province, for the year 1903. Presented to the Legislature, 10th February, 1904. *Printed.*

No. 26 . . Report of Ontario Fairs and Exhibitions of the Province, for the year 1903. Presented to the Legislature, 10th February, 1904. *Printed.*

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No. 27 . . Report of the Bureau of Industries of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 28 . . Report of the Commissioner of Highways, for the year 1903. Presented to the Legislature, 7th March, 1904. *Printed.*

No. 29 . . Report of the Bureau of Labour, for the year 1903. Presented to the Legislature, 24th March, 1904. *Printed.*

No. 30 . . Report of the Ontario Game Commission, for the year 1903. Presented to the Legislature, 26th February, 1904. *Printed.*

No. 31 . . Report of the Department of Fisheries, for the year 1903. Presented to the Legislature, 5th April, 1904. *Printed.*

No. 32 . . Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1903. Presented to the Legislature, 10th February, 1904. *Printed.*

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No. 34 . . Report of the Inspector of Legal Offices, for the year 1903. Presented to the Legislature, 14th April, 1904. *Printed.*

No. 35 . . Report of the Inspector of Registry Offices, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 36 . . Report of the Provincial Board of Health, for the year 1903. Presented to the Legislature, 15th February, 1904. *Printed.*

No. 37 . . Report of the Secretary and Registrar of the Province, for the year 1903. Presented to the Legislature, 14th March, 1904. *Printed.*

No. 38 . . Report upon the Lunatic and Idiot Asylums of the Province, for the year ending 30th September, 1903. Presented to the Legislature, 26th February, 1904. *Printed.*

No. 39 . . Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1903. Presented to the Legislature, 24th March, 1904. *Printed.*

No. 40 . . Report upon the Hospitals and Charities of the Province, for the year ending 30th September, 1903. Presented to the Legislature, 30th March, 1904. *Printed.*

No. 41 . . Report upon the Institution for the Education of the Blind, Brantford, for the year ending 30th September, 1903. Presented to the Legislature, 8th February, 1904. *Printed.*

No. 42 . . Report upon the Institution for the Education of the Deaf and Dumb, Belleville, for the year ending 30th September, 1903. Presented to the Legislature, 8th February, 1904. *Printed.*

No. 43 . . Report of Superintendent, Neglected and Dependent Children of Ontario, for the year 1903. Presented to the Legislature, 22nd February, 1904. *Printed.*

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No. 44 . . Report upon the Inspection of Liquor Licenses, for the year 1903. Presented to the Legislature, 11th March, 1904. *Printed.*

No. 45 . . Report of the Provincial Municipal Auditor for the year 1903. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 46 . . Return from the Records of the several Elections in the Electoral Divisions of Muskoka, Sault Ste. Marie and North Renfrew since the General Elections of May 29th, 1902, shewing: (1) The number of Votes polled for each candidate in the Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of Votes polled in each District; (4) The number of Votes remaining unpolled; (5) The number of names on the Voters' Lists in each District; (6) The population of each District as shewn by the last census. Presented to the Legislature, 21st January, 1904. *Printed.*

No. 47 . . Report upon the state of the Library. Presented to the Legislature 14th January, 1904. *Not printed.*

No. 48 . . Report of the Archivist, Ontario, for the year 1903. Presented to the Legislature, 14th April, 1904. *Printed.*

No. 49 . . Copy of an Order in Council advising that the tender of the Riordon Paper Mills, Limited, for the supply of Paper to the Province, for the ensuing five years, be accepted. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 50 . . Copy of an Order in Council in accordance with the provisions of section 9 of the Act, respecting the Education Department. Presented to the Legislature, 4th February, 1904. *Not printed.*

No. 51 . . Copy of an Order in Council, advising that the Agreement for renewal of Contract between Warwick Brothers and Rutter, with reference to the Printing and Binding for the Province, be approved. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 52 . . Copy of an Order in Council, respecting the commutation of the Surrogate Court Fees of the County of Huron. Presented to the Legislature, 8th February, 1904. *Not printed.*

No. 53 . . Copy of an Order in Council, respecting the commutation of Surrogate Court Fees of the County of Bruce. Presented to the Legislature 4th February, 1904. *Not printed.*

No. 54 . . Copy of an Order in Council, respecting the commutation of the Surrogate Court Fees of the Counties of York and Wentworth. Presented to the Legislature, 4th February, 1904. *Not printed.*

No. 55 . . Return to an Order of the House of the tenth day of June, 1903, for a Return of copies of all correspondence between the Government, or any member or department thereof, and any other person or persons, respecting the establishment of a Reformatory in the County of Oxford. Presented to the Legislature, 4th February, 1904. Mr. *Sutherland.* *Not printed.*

No. 56 . . Return to an Order of the House of the fourth day of June, 1903, for a Return of copies of all correspondence, papers, documents, decisions and memoranda in any way relating to the Mining Locations H.W.696, H.W.697, H.W.698 and H.W. 705, and particularly as to the southerly part of H.W. 697, containing thirteen acres, granted to one Gideon Larivière, which locations, are situate on, or near the North Pay of Sturgeon Lake in the District of Thunder Bay. Presented to the Legislature, 4th February, 1904. Mr. *St. John.* *Not printed.*

No. 57 . . Return to an Order of the House, of the twelfth day of June, 1903, for a Return,—similar to that ordered by the British House of Commons on the 25th day of June, 1902, of reproductive undertakings operated by Municipal Boroughs in Great Britain—respecting waterworks, electric lighting plants, gas works and other public utilities operated by Municipalities in the Province of Ontario, also the rates charged the consumers in the various Municipalities of the Province for water, gas and electric lighting. Presented to the Legislature, 4th February, 1904. Mr. *Preston (Brant).* *Printed.*

No. 58 . . Return to an Order of the House, of the fourth day of June, 1903, for a Return of copies of all correspondence between the Minister, or Commissioner of Public Works, or Fisheries, or other officer, or *employe*, of or under them, or either the Departments of Public Works, or Fisheries, and any other person or persons, and also any order or directions, or papers, or entries respecting the

granting of licenses for pound net fishing, east of a line running from Cape Hurd to the mouth of the Spanish River, during the years 1899, 1900, 1901 and 1902, or either or any of them. Also, copies of all such licenses granted during the above years, or either, or any of them. Presented to the Legislature, 4th February, 1904. Mr. *Smyth*. *Not printed.*

No. 59 . . Return to an Order of the House, of the 8th day of June, 1903, for a Return of all copies of all forms of application or subscription for terminating stock and of all forms of certificates of such stock used by Loan Corporations doing business in the Province. Presented to the Legislature, 4th February, 1904. Mr. *Downey*. *Not printed.*

No. 60 . . Return to an Order of the House, of the fourth day of June, 1903, for a Return of copies of all correspondence, between the Metropolitan Power Company, or their Solicitors, and the Government for a grant of land under the waters of the Ottawa River, and all papers in connection therewith. Presented to the Legislature, 4th February, 1904. Mr. *Matheson*. *Not printed.*

No. 61 . Copy of an Order in Council and Report of Registrar of Loan Corporations in the matter of the Canadian Co-operative Alliance. Presented to the Legislature, 5th February, 1904. *Not printed.*

No. 62 . . Copy of an Order in Council respecting Surrogate Court Fees to be paid to His Honour Judge Holt. Presented to the Legislature, 10th February, 1904. *Not printed.*

No. 63 . . Copy of an Order in Council respecting Surrogate Court Fees to be paid to His Honour Judge Jamieson. Presented to the Legislature, 10th February, 1904. *Not printed.*

No. 64 . . General Rules and Orders made by the Court of Appeal for Ontario respecting the trial of Election Petitions pursuant to the Controverted Elections Act, R.S.O., 1897, cap. 11, and amending Acts. Presented to the Legislature, 12th February, 1904. *Printed. For distribution only.*

No. 65 . . Return to an Order of the House, of the eighth day of February, 1904, for a Return shewing the names of all persons at Sault Ste. Marie, or elsewhere, who have been paid by the Government under the decision, or determination, to pay the wages of workmen at Sault Ste. Marie, and showing also the amount paid in each case and the nature of the claim in each case. Presented to the Legislature, 15th February, 1904. Mr. *Whitney*, *Printed.*

No. 66 . . Return to an Order of the House, of the tenth day of February, 1904 for a Return shewing the number of students admitted to (a) the Normal Schools of the Province since September, 1903. (b) How many (if any) of such students, prior to admission, taught less than twelve months in a Public School and (c) How many (if any) did not attend a Model School course and secured a certificate of competency therefrom. Presented to the Legislature, 16th February, 1904. Mr. *Hoyle*. *Not printed.*

No. 67.. Copy of an Order in Council, commuting the fees of F. H. MacDonald, Local Master at St. Catharines. Presented to the Legislature, 18th February, 1904. *Not printed.*

No. 68... Return to an Order of the House of the twenty sixth day of June, 1903, for a Return shewing:—1. The total area of Crown Lands under timber License. 2. The total area of Crown Lands under timber License in arrears. 3. The number of timber Licenses in arrear, their locations, respective areas, the names of those persons so in arrears, and the amounts that each of such persons are in arrear, and for what respectively. 4. The number of timber Licenses cancelled since and including 1891, and the number of acres of Licenses so cancelled. 5. The nature and extent of the securities (if any) held by the Government, for payment of such areas, and, the names of the persons so giving security. 6. The number of timber Limits disposed of otherwise than by Public Auction, since and including the year 1891, specifying the details thereof, as to time, place, person and prices respectively. 7. The number of pieces of saw-logs cut under License in the Province of Ontario, each year since and including 1891; the aggregate quantity of lumber, board measure, returned to the Crown Lands Department for each of the said years since and including 1891; the amount of Crown dues collected for each of the said years from the lumber cut, giving the quantity for each separate price charged for dues. 8. The number of pieces of waney or board timber cut under license in each of the said years and the aggregate quantity of cubic feet and the amount of Crown dues collected on the same. 9. The number of pieces of square timber cut and the quantity of cubic feet returned as contained in same and the amount collected for each of the said years thereon, for Crown dues. Presented to the Legislature 18th February, 1904, Mr. *St. John. Printed.*

No. 69.. Return to an Order of the House of the fifteenth day of February, 1904, for a Return of copies of all complaints received by the License Department against W. S. Cowan, formerly inspector of licenses for South Wellington; also, for a copy of the report of the investigation into such complaints, including the evidence; also, for a copy of the report of the Inspector who investigated the complaints, and also, for a copy of all correspondence touching the dismissal of the said W. S. Cowan. Presented to the Legislature, 22nd February, 1904. Mr. *Downey. Not printed.*

No. 70.. Return to an Order of the House of the nineteenth day of February, 1904, for a Return of copies of all correspondence between the Inspector of Prisons and Charities, or other official of the Government, and the County of Ontario, having reference to the salary of the County Gaoler. Presented to the Legislature 22nd February, 1904. Mr. *Hoyle. Not printed.*

No. 71.. Copy of Memorandum of Agreement between His Majesty, represented by the Commissioner of Crown Lands and Edward Wellington Backus, of the City of Minneapolis. Presented to the Legislature 23rd February, 1904. *Not printed.*

No. 72.. Return to an Order of the House of the twelfth day of February, 1904, for a Return, shewing in the same detail as in the Public Accounts of the Province, all expenditures up to 31st December, 1903, on account of the Temiskaming and Northern Ontario Railway, giving in detail the amount paid, to whom and on what account. And, in the case of the payments to the contractors for the building of the road—shewing all the quantities of rock and other material moved : masonry constructed and generally, all quantities on which payments are based, with the amount paid therefor upon each section of road. Presented to the Legislature, 29th February, 1904. Mr. *Matheson. Printed.*

No. 73.. Return to an Order of the House of the nineteenth day of February 1904, for a Return of copies of all correspondence between the Government, or any officials thereof, and any person or persons, regarding the establishment of Savings Banks in connection with the Schools of the Province. Presented to the Legislature, 29th February, 1904. Mr. *Preston (Brant.) Not printed.*

No. 74.. Return to an Address to His Honour the Lieutenant-Governor of the twenty-second day of February, 1904, praying that he will cause to be laid before this House, a Return of copies of all Orders in Council with reference to the payment of *employes* at Sault Ste. Marie, together with copies of all correspondence previous to, after and in any way relating to such payments. Presented to the Legislature, 1st March, 1904. Mr. *Whitney. Printed.*

No. 75 .. Return to an Order of the House of the twenty-sixth day of February, 1904, for a Return of copies of all correspondence with the Government, or other person, relating to the appointment of one Kelly, as constable, or peace officer, in and about Killarney, together with copies of all correspondence between the Government and one Charles Noble in connection therewith. Presented to the Legislature, 1st March, 1904. Mr. Gamey. *Not printed.*

No. 76 .. Return to an Order of the House of the twenty-fourth day of February, 1904, for a Return of copies of all correspondence, papers and pay sheets, between the Government, or any member or official thereof, in connection with the expenditure of all moneys expended last year, on Colonization Roads in the County of Addington. Presented to the Legislature, 1st March, 1904. Mr. Reid. *Not printed.*

No. 77 .. Return to an Order of the House of the twelfth day of February, 1904, for a Return of copies of all correspondence between the Government or any member, or official thereof, or persons on its behalf, and any other person or persons in connection with the appointment of William Coats, as Registrar of the County of Huron. Presented to the Legislature, 7th March, 1904. Mr. Eilber. *Not printed.*

No. 78 .. Statement of distribution of Revised and Sessional Statutes up to 31st December, 1903. Presented to the Legislature, 9th March, 1904. *Not printed.*

No. 79 . . Return to an Order of the House of the twenty-ninth day of February 1904, for a Return shewing: 1. The amount of money paid as Railway Subsidies from 1867 up to and inclusive of 1903. 2. The name of each Railway and the amount paid as Subsidy thereto. 3. The amount of money voted for Railway Subsidies, but not yet earned. 4. The amounts in acres voted and set apart as Land Grants, during the same period. 5. The names of all Railways which have earned the apportionment of land so set apart. 6. The amount in process of being earned. Presented to the Legislature, 9th March, 1904. Mr. Preston. (Durham.) *Not printed.*

No. 80 . . Return to an Order of the House of the Seventh day of March, 1904, for a Return, shewing the number of Saloon Licenses in the different Cities of the Province during the years 1901 and 1903. Also, the number of Saloon Licenses in the Towns of the Province, during the same period. Also, the number of Wholesale Licenses granted in rural municipalities, in the Province, during the same, period. Presented to the Legislature, 10th March, 1904. Mr. *Barr. Not printed.*

No. 81 . . Return to an Order of the House of the Eleventh day of March, 1904 for a Return of copies of all correspondence, between the Government, or any official thereof, and the President of the Children's Aid Society of Brockville, or any other person or persons, in reference to the arrest and imprisonment of certain young lads in 1902, 1903 and 1904. Presented to the Legislature, 18th March, 1904. Mr. *Graham. Not printed.*

No. 82 . . Return to an Address to His Honour, the Lieutenant-Governor, of the fourth day of March, 1904, praying that he will cause to be laid before this House, a copy of all Orders-in-Council, authorizing or permitting an increase in the capital stock of the Peoples' Life Insurance Company, during the last two years, together with copies of all correspondence in any way relating thereto. Presented to the Legislature, 24th March, 1904. Mr. *Gamey. Not printed.*

No. 83 . . Return to an Order of the House, of the twenty-fifth day of March, 1904, for a Return shewing the names of all persons convicted for violation of any of the provisions of the Liquor License Act in the County of Carleton during the years 1901, 1902 and 1903, with the amounts of fines and costs imposed in each case respectively and showing, as well, the particular offence of which they were convicted and dates of conviction. Presented to the Legislature, 29th March, 1904. Mr. *Kidd. Not printed.*

No. 84 . . Return to an Order of the House, of the twenty-fifth day of March, 1904, for a Return, in detail of all payment made by the Commissioners of the Queen Victoria Niagara Falls Park, for the year 1903. Presented to the Legislature, 29th March, 1904. Mr. *Jessop. Not printed.*

No. 85 . . Return to Orders of the House, of the fourteenth, twenty-first (two orders), and twenty-fifth days of March, 1904, for Returns shewing :— .

1. The names of the various companies included in the Consolidated Lake Superior Companies, which the Government proposes to aid by the $2,000,000 guarantee. 2. The names of the secured creditors of each company and the amount of the claim of each and the security held by each. 3. The names of the unsecured creditors of each company and the amount of claim of each. 4. Shewing what portion of the Algoma Central Railway is already completed, how much partly constructed and what construction work has been done on the part incomplete. 5. Shewing what portion of the road has been operated and what net earnings, if any, it has shewn. 6. The names of the vessels which it is proposed to give the Province as security, with statement shewing what these vessels have earned, net, in the hands of the Companies. Also, shewing full particulars of all claims, charges, judgments and priorities chargeable against the Superior Consolidated Companies and the Algoma Central Railway; the names of all the creditors and the nature and amount of their respective claims, and particulars of all assets on which are based, and subject to which it is the intention of the Government to guarantee the sum of $2,000,000 to such companies as embodied in the Bill introduced to this House, before the second reading of such Bill. Also, shewing: 1. What lands and securities are governed by the Lien of Messieurs James Conmee, M.P.P., and Charles M Bowman, M.P.P., against the Algoma Central and Hudson Bay Railway Company, for upwards of $400,000, dated on or about the 22nd day of September, 1903 2. Whether the judgment of James Conmee, M.P.P., and Charles M. Bowman, M.P.P., against the Algoma Central and Hudson Bay Railway Company for upwards of $400,000, and dated on or about the 12th day of October, 1903, is still a charge on the assets of this company. 3. And shewing the amount of the said Judgment at the present time. And also, shewing the names of the allied industries referred to in section 1 of Cill (No. 129), Respecting Aid to the Algoma Central and Hudson Bay Railway. 2. A copy of the Mortgage referred to in subsection 1 of said section 1. 3. A copy of the Mortgage referred to in subsection 2 of said section 1. 4. A copy of the Promissory Note referred to in subsection 3 of said section 1. 5. A copy of the Stock Certificates of the Stock referred to in subsections 4 and 5 of said section 1. 6. A copy of the Trust Deed, or any draft thereof, referred to in section 2. 7. A copy of the Guaranty referred to in section 3. 8. Shewing what amount is referred to in subsection 3 of section 4. 9. How many Directors are provided for the re-organized Company. 10. A copy of the Deed, or any draft thereof, referred to in subsection 10 of section 4. 11 A copy of the plan of re-organization referred to in subsection 11 of section 4. Presented to the Legislature, 11th April, 1904. Messieurs *Hanna* and *Pyne*. *Printed.*

No. 86 . . Return to an Order of the House, of the sixteenth day of March, 1904, for a Return shewing the copyrighted selections and extracts from authors, used in the authorized text-books of the Public Schools, indicating in each case, the pages and the names of the persons or company controlling the copyrights. Presented to the Legislature, 7th April, 1904. Mr. *Nesbitt*. *Not printed.*

No. 87 . . Return to an Order of the House, of the second day of March, 1904, for a Return, shewing all payments under the San Jose Scale Act, as follows:—1st. Amount paid to the owners of trees destroyed. 2nd. Amount paid to officers of the Province for enforcing the Act, and 3rd. In what Counties the trees were destroyed. Presented to the Legislature, 7th April, 1904. Mr. *Lee*. *Not printed.*

No. 88 . . Return to an Order of the House of the fourteenth day of March 1904, for a Return, giving copies of all correspondence between any person or official, on behalf of the University of Toronto and any member of the Government, with reference to the construction of a Physical Laboratory for the University. Also, copies of the Statute of the Senate of the University providing for the establishment of a Department of Forestry in the University, together with copies of all correspondence relating to the establishment of such Department. Presented to the Legislature, 7th April, 1904. Mr. *Whitney*. *Not printed.*

No. 89 . . Return to an Order of the House of the sixteenth day of March, 1904, for a Return of copies of all correspondence between the Government, or any Official thereof, and any person or persons, regarding the issue of licenses for the use of pound nets on Lake Nipissing. Presented to the Legislature, 8th April, 1904. Mr. *Little (Cardwell.)* *Not printed.*

No. 90 . . Return to an Order of the House of the Eleventh day of March, 1904, for a Return of copies of all correspondence between the Government, or any official thereof, and any other party or parties regarding the issue of pound-net fishing licenses in 1902 and 1903 in the waters between Killarney and Little Current, known as the North Channel. Presented to the Legislature 8th April, 1904. Mr. *Gamey*. *Not printed.*

No. 91 . . Return to an Order of the House of the sixteenth day of March, 1904, for a Return giving the names of Public School Inspectors since 1870, in Ontario. Also, the class of certificates they hold, or held, and shewing as well, the standing which each one obtained on their respective examinations entitling them to act as Inspectors of Public Schools. Presented to the Legislature, 20th April, 1904. Mr. *Gamey*. *Not printed.*

No. 92 . . Return to an Order of the House of the twenty-fifth day of March, 1904, for a Return of papers and all correspondence in connection with the issue of Patent for the south half of lot No. 8 in the 4th Concession of the Township of Hutton, in the District of Nipissing. Presented to the Legislature, 23rd April, 1904. Mr. *Matheson*. *Not printed.*

No. 93 . . Return to an Address to His Honour the Lieutenant-Governor of the twenty-second day of April, 1904, praying that he will cause to be laid before this House, a Return of a copy of the Judgment of the Judicial Committee of the Privy Council in the case of the Ontario Mining Company *et al.*, *vs.* Seybold *et al.*, together with a

copy of the agreement between Counsel for the Dominion of Canada and the Province of Ontario arising out of the argument of the said Appeal. Presented to the Legislature 23rd April, 1904. Mr. *Cameron (Huron.)* *Printed.*

No. 94 . . Return to an Address to His Honour the Lieutenant-Governor, of the twenty-second day of April, 1904, praying that he will cause to laid before the House. a Return of a copy of the Judgment of the Court of Appeal for Ontario, in answer to certain questions submitted. involving the validity of legislation by the Province respecting the profanation of the Lord's Day, and also the notes of argument and judgment of the Judicial Committee of the Privy Council upon the appeals thereto. Presented to the Legislature 23rd April, 1904. Mr. *Little (Norfolk.)* *Printed.*

REPORT

OF THE

MINISTER OF EDUCATION

PROVINCE OF ONTARIO

FOR THE YEAR 1903

PART I

(WITH THE STATISTICS OF 1902)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed and Published by L. K. CAMERON,
Printer to the King's Most Excellent Majesty.
1904.

WARWICK BROS. & RUTTER
Printers.

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GENERAL REPORT, 1903.

EDUCATION DEPARTMENT.

MINISTER OF EDUCATION.

HON. RICHARD HARCOURT, M.A., LL.D., K.C.

DEPUTY MINISTER OF EDUCATION:

JOHN MILLAR, B.A.

H. M. Wilkinson,	Senior Clerk and Accountant.
H. R. Alley,	Clerk and Minister's Secretary.
A. C. Paull,	Senior Clerk.
T. J. Greene,	Clerk.
E. A. Faulds,	"
Allen Ker	"
T. F. Callaghan,	"
R. J. Bryce,	"
F. Woodley,	"
Miss S. B. Shields,	Stenographer.
L. McCorkindale,	Caretaker.

Departmental Examinations.

W. H. Jenkins, B. A.,	Registrar.
J. T. R. Stinson,	Senior Clerk.
F. N. Nudel,	Secretary to Board of Examiners.
W. W. Jeffers,	Clerk.
S. A. May,	"

Public Libraries, Art Schools, Etc.

S. P. May, M.D., C.L.H.,	Superintendent.
Wm. Lemon,	Clerk.

Library and Museum.

J. George Hodgins, M.A., LL.D.,	Librarian and Historiographer.
David Boyle,	Curator of Museum.
Miss J. M. Crooks,	Assistant Librarian.

REPORT

OF THE

MINISTER OF EDUCATION

FOR THE YEAR 1903.

PART I.

WITH STATISTICS OF 1902.

To the Honourable Wm. Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I herewith present Part I. of the Report of the Education Department for the year 1903, with the statistics for the year 1902.

SUMMARY OF STATISTICS.

I. *ELEMENTARY SCHOOLS.

a. Public Schools.

Number of Public Schools in 1902		5,671
Increase for the year	8	
Number of enrolled pupils of all ages in the Public Schools during the year		408,124
Decrease for the year	6,495	
Average daily attendance of pupils		232,663
Decrease for the year	2,421	
Percentage of average attendance to total attendance		57.01
Number of persons employed as teachers (exclusive of Kindergarten and Night School teachers) in the Public Schools: men, 2,200; women, 6,297; total		8,497
Decrease: men, 153; increase, women, 247; total increase	94	
Number of teachers who attended Normal School		4,601
Increase for the year	174	

*The Curriculum of Elementary Schools embraces the following subjects: Reading, Writing, Arithmetic, Composition, Drawing, English Literature, Geography, Music, Grammar, History, Physiology and Temperance, Drill and Calisthenics, Bookkeping, Alegbra, Geometry, Botany, Elementary Physics, Agriculture, Manual Training and Household Science.

Number of teachers with a University Degree		81
Average annual salary of male teachers		$436
Increase for the year	$15	
Average annual salary of female teachers		$313
Increase for the year	$7	
Amount expended for Public School Houses (sites and buildings)		$331,842
Amount expended for teachers' salaries		$2,987,933
Amount expended for all other purposes		$1,069,944
Total amount expended on Public Schools		$4,389,719
Increase for the year	$61,037	

b. Roman Catholic Separate Schools.

Number of Roman Catholic Separate Schools in 1902		391
Increase for the year	19	
Number of enrolled pupils of all ages		45,964
Increase for the year	1,977	
Average daily attendance of pupils		28,817
Increase for the year	1,891	
Percentage of average atttendance to total attendance		62.69
Number of teachers		870
Increase for the year	52	
Amount expended for School Houses (sites and buildings)		$100,910
Amount expended for teachers' salaries		$210,199
Amount expended for all other purposes		$124,331
Total amount expended on R. C. Separate Schools		$435,440
Increase for the year	$43,812	

c. Protestant Separate Schools.

Number of Protestant Separate Schools (included with Public Schools, *a*) in 1902		6
Decrease for the year	1	
Number of enrolled pupils		466
Increase for the year	16	
Average daily attendance of pupils		247
Decrease for the year	2	

d. Kindergartens.

Number of Kindergartens in 1902		120
Increase for the year	2	
Number of pupils enrolled		11,300
Decrease for the year	105	
Average daily attendance of pupils		4,596
Decrease for the year	108	
Number of teachers engaged		247
Decrease for the year	4	

e. Night Schools.

Number of Night Schools in 1902-3		11
Decrease for the year	1	
Nmuber of pupils enrolled		670
Decrease for the year	130	
Average daily attendance of pupils		170
Decrease for the year	24	
Number of teachers engaged		17
Decrease for the year	5	

II. *SECONDARY SCHOOLS.

a. High Schools.

Number of High Schools (including 40 Collegiate Institutes) in 1902	134
Increase for the year 3	
Number of Teachers in High Schools	593
Increase for the year 14	
Number of pupils in High Schools	24,472
Increase for the year 1,949	
Amount expended for High School teachers' salaries	$547,402
Amount expended for High School houses (sites and buildings)	$44,246
Amount expended for all other High School purposes	$178,031
Total amount expended on High Schools	$769,679
Increase for the year	$41,547

b. Continuation Classes.

Number of Continuation Classes, 1902-3, (included in Public and Separate Schools, I, *a* and *b*,) practically doing High School work: Grade A, 65 ; Grade B, 48 ; Grade C, 134 ; Grade D, 233 ; total	480
Increase for the year, Grade A, 6	
Decrease, Grade B, 1 ; Grade C, 15 ; Grade D, 50	
Number of pupils in attendance	4,864
Decrease for year 69	

I.—PUBLIC SCHOOLS.

These tables (for the purpose of comparison with pervious years in which the R. C. Separate Schools were included with Public Schools) include R. C. Separate Schools. In the Statistical Tables, A, B, C, D, E, the Separate Schools are excluded.

1.—School Population—Attendance.

The School population of the Province, as ascertained by the assessors, is as follows :

Year.	School age	School population.	Pupils registered under 5.	Pupils registered 5 to 21.	Pupils registered over 21.	Total number of registered pupils.	Average daily attendance.	Percentage of average attendance to total number attending school.
1867	5—16	447,726	.....	†380,511	‡21,132	401,643	163,974	40.82
1872	5—16	495,756	.....	†433,664	‡20,998	454,662	188,701	41.50
1877	5—16	494,804	1,430	488,553	877	490,860	217,184	44.25
1882	5—16	483,817	1,352	469,751	409	471,512	214,176	45.42
1887	5—21	611 212	1,569	491,242	401	493,212	245,152	49.71
1892	5—21	595,238	1,636	483,643	391	485,670	253,830	52.26
1897	5—21	590,055	1,385	481,120	272	482,777	273,544	56.66
1901	5—21	574,490	1,070	457,436	100	458,606	262,010	57.13
1902	5—21	584,512	1,001	452,977	110	454,088	261,480	57.58

* The Curriculum of Secondary Schools includes all the subjects required for matriculation into the University.

† 5—16. ‡ Other ages. Note.—Kindergarten and Night School pupils are not included in above table.

A slight increase over 1901 in the percentage of average daily attendance to the total number of pupils enrolled is noticed in the preceding table, viz., .45. While the number enrolled was 4,518 less than in 1901, the average attendance was only 550 less.

2.—Classification of Pupils.

Year.	1st Reader—Parts I and II.	2nd Reader.	3rd Reader.	4th Reader.	5th or High School Reader.	Writing.	Arithmetic.	Drawing.	Geography.	History.	Music.	Grammar and Composition.	Temperance and Hygiene.
1867	79,367	98,184	83,211	68,896	71,987	231,784	241,501	5,450	272,173	61,787	47,618	147,412	.....
1872	160,824	100,245	96,481	67,440	29,668	222,688	327,218	57,582	327,139	109,639	110,083	282,156	.....
1877	153,630	108,678	135,824	72,871	19,857	296,006	402,248	153,036	375,951	116,865	168,942	226,977	.....
1882	165,834	106,129	117,352	71,740	10,377	298,401	419,557	176,432	280,517	150,989	158,694	209,184	33,926
1887	192,361	100,533	108,096	81 984	10,238	466,389	469,445	395,097	316,791	194,754	203,567	270,856	71,525
1892	187,947	96,074	99,345	88,934	13,370	465,516	470,818	435,239	334,947	253,956	220,941	294,331	171,594
1897	181,375	91,330	99,682	89,314	21,076	465,525	471,869	448,444	342,189	284,025	233,915	316,787	215,343
1901	178,077	86,982	92,203	84,106	17,238	451,067	452,022	439,696	322,848	270,589	266,230	297,126	197,605
1902	176,503	85,732	90,630	83,738	17,485	445,316	449,573	434,030	318,755	269,954	268,356	296,172	194,459

A satisfactory feature of the above table is that, while there is a decreased enrolled attendance of 4,518, or about one per cent. since 1901, the decrease is practically all in the three lower forms, showing that more pupils take advantage of the two higher forms than formerly. This is especially noticeable in the fifth form, owing in a great measure to the extension of Continuation Classes.

The first form shows a decreased attendance since 1901 of 1,574, or about one per cent.; the second, 1,250, or 1.4 per cent.; the third, 1,573, or 1.7 per cent.; the fourth, only 368, or .4 per cent.; whilst the fifth form shows an increased attendance of 247, or 1.4 per cent., over 1901.

3.—Teachers' Certificates and Salaries.

Teachers' Certificates.

Year.	Public school teachers.	Male.	Female.	1st class.	2nd class.	3rd class.	Other certificates, including old County Board etc.	Number of teachers who attended Normal School
1867	4,890	2,849	2,041	1,899	2,454	386	151	666
1872	5,476	2,626	2,850	1,337	1,477	2,084	578	828
1877	6,468	3,020	3,448	250	1,304	3,926	988	1,084
1882	6,857	3,062	3,795	246	2,169	3,471	971	1,873
1887	7,594	2,718	4,876	252	2,553	3,865	924	2,434
1892	8,480	2,770	5,710	261	3,047	4,299	873	3,038
1897	9,128	2,784	6,344	343	3,386	4,465	934	3,643
1901	9,221	2,437	6,784	611	4,125	3,571	914	4,572
1902	9,367	2,294	7,073	608	4,296	3,432	1,031	4,774

The percentage of men in the profession is steadily declining. In 1902, the number was only 24.5 per cent., while the number of women was 75.5 per cent. of the whole.

Another increase is shown in the number of teachers who have attended Normal School, viz.: 202 over 1901.

In 1902 eighty-one teachers held University Degrees in Art.

Teachers' Salaries.

Year.	Highest salary paid.	Average salary, male teacher, province.	Average salary, female teacher, province.	Average salary, male teacher, counties, etc.	Average salary, female teacher, counties, etc.	Average salary, male teacher, cities.	Average salary, female teacher, cities.	Average salary, male teacher, towns.	Average salary, Female teacher, towns.
	$	$	$	$	$	$	$	$	$
1867	1,350	346	226	261	189	532	243	464	240
1872	1,000	360	228	305	213	628	245	507	216
1877	1,100	398	264	379	251	735	307	583	269
1882	1,100	415	269	385	248	742	331	576	273
1887	1,450	425	292	398	271	832	382	619	289
1892	1,500	421	297	383	269	894	402	648	298
1897	1,500	391	294	347	254	892	425	621	306
1901	1,550	421	306	359	262	915	470	649	315
1902	1,600	436	313	372	271	935	479	667	317

From the above table it will be seen that, while the average salaries for teachers in the Province are higher for both men and women than at any previous period and while the salaries in the cities and towns are considerably higher, the salaries in the counties, etc., or rural and village sections, are not as high as formerly.

When these salaries are considered, in connection with the increased cost of living and of obtaining the necessary qualifications, it will be seen that they are still very low.

4.—Receipts and Expenditure.

Year.	Receipts.				Expenditure.					
	Legislative grants.	Municipal School grants and assessments.	Clergy Reserve funds, balances and other sources.	Total receipts.	Teacher's salaries.	Sites and building school houses.	Libraries, maps, apparatus, prizes, etc.	Rents, repairs, fuel and other expenses.	Total expenditure.	Cost per pupil.
	$	$	$	$	$	$	$	$	$	$ c.
1867	187,153	1,151,583	331,599	1,670,335	1,093,517	149,195	31,354	199,123	1,473,189	3 67
1872	225,318	1,763,492	541,460	2,530,270	1,371,594	456,043	47,799	331,928	2,207,364	4 85
1877	251,962	2,422,432	730,687	3,405,081	2,038,099	477,393	47,539	510,458	3,073,489	6 26
1882	265,738	2,447,214	756,038	3,469,990	2,144,449	341,918	15,583	525,025	3,026,975	6 42
1887	268,722	3,084,352	978,283	4,331,357	2,458,540	544,520	27,509	711,535	3,742,104	7 59
1892	283,791	3,300,512	1,227,596	4,811,899	2,752,629	427,321	40,003	833,965	4,053,918	8 40
1897	366,538	3,361,562	1,260,055	4,988,155	2,886,061	391,689	60,585	877,335	4,215,670	8 73
1901	377,308	3,784,070	1,468,978	5,630,056	3,055,321	531,072	81,685	1,052,232	4,720,310	10 29
1902	383,666	3,959,912	1,422,924	5,766,502	3,198,132	432,753	86,723	1,107,552	4,825,160	10 63

The Government and Municipal Grants are increasing year by year; also the amount paid as teachers' salaries and other expenses. The expenditure per pupil, $10.63, shows a slight increase over 1901.

II.—ROMAN CATHOLIC SEPARATE SCHOOLS.

Year.	Schools—Expenditure—Teachers.					Number of pupils attending—Number in the various branches of instruction.						
	Schools open.	Total receipts.	Total expenditure	Teachers.	Pupils.	Reading.	Writing.	Arithmetic.	Geography.	Grammar.	Drawing.	Temperance and Hygiene.
		$	$									
1867..	161	48,629	42,719	210	18,924	18,924	10,749	10,559	8,666	5,688	.....	.....
1872..	171	68,810	61,817	254	21,406	21,406	13,699	12,189	8,011	7,908	.....	.....
1877..	185	120,266	114,806	334	24,952	24,952	17,932	17,961	13,054	11,174	.....	.....
1882..	190	166,729	154,340	390	26,148	26,148	21,052	21,524	13,900	11,695	7,548	2,033
1887..	229	229,848	211,223	491	30,373	23,373	27,824	28,501	19,608	18,678	21,818	8,578
1892..	312	326,034	289,638	662	37,466	37,466	35,565	35,936	26,299	22,755	32,682	11,056
1867..	346	335,324	302,169	752	41,620	41,620	39,724	40,165	27,471	26,071	36,462	18,127
1901..	372	436,721	391,628	818	43,987	43,987	43,987	43,987	27,454	25,211	40,646	13,505
1902..	391	485,503	435,441	870	45,964	45,964	45,964	45,964	29,788	27,409	41,952	14,687

Yearly increases in receipts and expenditure and in the number of schools, teachers and pupils, etc., are noticed in connection with the Roman Catholic Separate Schools.

III.—PROTESTANT SEPARATE SCHOOLS.

The complete list of Protestant Separate Schools is as follows:—

No. 9 Cambridge, No. 6 Plantagenet North, Rama, No. 1 N. Tilbury, L'Orignal, and Penetanguishene.

They were attended by 466 pupils. The whole amount expended for their maintenance was $4,208. Six teachers held a Second Class, two a Third Class, and one a Temporary Certificate.

IV.—COLLEGIATE INSTITUTES AND HIGH SCHOOLS.

The following statistics respecting Collegiate Institutes and High Schools will be found suggestive:

1.—Receipts, Expenditure, Attendance, Etc.

Year.	Schools open.	Teachers.	Receipts.			Expenditure.			Pupils.	Percentage of average attendance to total attendance.	Cost per pupil.
			Amount of fees.	Legislative grant.	Total receipts.	Paid for teachers' salaries.	Paid for sites and building school houses rents and repairs.	Total expenditure.			
			$	$	$	$	$	$			$ c.
1867.....	103	159	15,605	54,562	139,579	94,820	19,190	124,181	5,696	55	21 80
1872.....	104	239	20,270	79,543	223,269	141,812	31,360	210,005	7,968	56	26 36
1877.....	104	280	20,753	78,762	257,521	211,607	51,417	343,710	9,229	56	37 24
1882.....	104	332	29,270	84,304	373,150	253,864	19,361	343,720	12,348	53	27 56
1887.....	112	398	56,198	91,977	529,323	327,452	73,061	495,612	17,459	59	28 38
1892.....	128	522	97,273	100,000	793,812	472,029	91,108	696,114	22,837	60	30 48
1897.....	130	579	110,859	101,250	767,487	532,837	46,627	715,976	24,390	61	29 35
1901.....	131	579	99,864	109,200	784,626	535,521	37,728	728,133	22,523	59	32 33
1902.....	134	593	105,801	112,650	832,853	547,402	55,675	769,080	24,472	59	31 45

2.—Classification of Pupils, etc.

Year.	English.					Mathematics.				Science.		
	English Grammar and Rhetoric.	English Composition.	Poetical Literature.	History.	Geography.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	Physics.	Chemistry.	Botany.
1867	5,467	4,091	.....	4,634	5,264	5,526	2,841	1,847	141	1,876	840	.....
1872	7,884	7,278	.....	7,513	7,715	7,834	6,033	2,592	174	1,921	1,151	.....
1877	8,819	8,772	.....	9,106	9,158	9,227	8,678	8,113	359	2,168	2,547	.....
1882	12,275	12,189	.....	12,220	12,106	12,261	11,742	11,148	397	2,880	2,522	.....
1887	17,086	17,171	16,649	17,010	16,962	16,939	16,904	14,839	1,017	5,265	3,411	4,640
1892	22,530	22,525	22,468	22,328	22,118	21,869	22,229	17,791	1,154	6,601	3,710	6,189
1897	19,591	24,195	24,176	18,318	13,747	19,798	24,105	16,788	1,652	11,002	5,480	12,892
1901	19,401	22,126	21,988	22,036	13,790	19,471	21,413	15,992	1,567	11,735	5,461	8,256
1902	21,576	24,241	23,768	23,559	14,500	21,594	22,953	16,881	1,662	12,758	5,860	9,051

2.—Classification of Pupils, etc.—*Continued.*

Year.	Languages.				Drawing.	Vocal music.	Bookkeeping and commercial transactions.	Left for mercantile life.	Left for agriculture.	Who joined a learned profession.	Matriculated.	Number of schools charging fees.
	Latin.	Greek.	French.	German.								
1867	5,171	802	2,164	.....	676	.....	1,283	.....	.....	.....	56	57
1872	3,860	900	2,828	341	2,176	.....	3,127	486	300	213	78	57
1877	4,955	871	3,091	442	2,755	.....	3,621	555	328	564	145	57
1882	4,591	815	5,363	962	3,441	.....	5,642	881	646	751	272	57
1887	5,409	997	6,180	1,350	14,295	1,955	14,064	1,141	882	791	305	57
1892	9,006	1,070	10,398	2,796	16,980	948	16,700	1,111	1,006	398	471	57
1897	16,873	1,421	13,761	5,169	12,252	160	11,647	5,368	1,153	409	652	57
1901	19,029	672	13,024	3,065	9,720	248	10,051	1,300	833	650	1,139	85
1902	18,884	631	13,595	3,280	10,721	138	11,334	1,573	743	705	1,071	82

The following table will be of interest regarding the occupation of parents of High School pupils and will show the classes of our population receiving most advantages from those institutions.

Agricultural	7,482
Commercial	6,477
Mechanical	6,052
Professional	2,311
Other callings	2,150

V. DEPARTMENTAL EXAMINATIONS, ETC.

1. Table showing the Number of Teachers inTraining at County Model Schools Normal College, Provincial Normal Schools, etc., 1877-1902.

Year.	County Model Schools.			Normal College.			Normal and Model Schools, etc.					
	No. of schools.	No. of teachers-in-training.	No. that passed final examination.	No. of teachers.	No. of students.	Receipts from fees of Normal College.	No. of Normal School teachers.	No. of Normal School students.	No. of Model School and Kindergarten teachers.	No. of Model School and Kindergarten pupils.	Receipts from fees of Normal Schools, Model Schools and Kindergarten pupils.	Expenditure, Normal and Model Schools.
						$ c.					$ c.	$ c.
1877	50	1,146	1,124	.....	.....	.....	13	257	8	643	7,909 22	25,780 88
1882	46	882	837	.....	.....	.....	16	260	15	799	13,783 50	44,888 02
1887	55	1,491	1,376	.....	.....	.....	13	441	18	763	16,427 00	40,188 66
1892	59	1,283	1,225	10	96	1,630 00	12	428	22	842	19,016 00	45,724 12
1897	60	1,645	1,384	12	180	4,374 00	13	407	23	832	18,797 59	46,390 91
1901	55	1,189	1,145	14	113	1,905 00	14	613	28	921	19,264 00	57,728 51
1902	54	1,171	1,138	15	132	2,405 00	16	619	31	958	20,735 00	56,672 98

2. Entrance Examinations, 1877-1903.

Year.	No. of candidates examined.	No of candidates who passed.
1877	7,383	3,836
1882	9,607	4,371
1887	16,248	9,364
1892	16,409	8,427
1897	16,384	10,502
1902	18,087	13,300
1903	19,058	13,003

3. Non-Professional and Matriculation Examinations, 1903.

	District Certificate.	Part II, Junior Leaving.	Junior Matriculation.	Part I, Senior Leaving.	Part II, Senior Leaving.	Commercial Diploma Part II.	Commercial Specialist.
No. candidates	348	2,618	1,360	625	441	259	79
No. who passed	140	1,269	675	328	173	189	32
No. of appeals	8	191	27	53	66	4	2
No. sustained	2	11	7	13	9	3	1

VI. TEACHERS' INSTITUTES.

This table presents the work of the Teachers' Institutes for twenty-six years:

Year.	No. of Teachers' Institutes.	No. of Members.	No. of teachers in the Province.	Receipts.				Expenditure.	
				Amount received from Government grants.	Amount received from municipal grants.	Amount received from members' fees.	Total amount received.	Amount paid for libraries.	Total amount paid.
				$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1877	42	1,181	6,468	1,412 50	100 00	299 75	2,769 44	.....	1,127 63
1882	62	4,395	6,857	2,900 00	300 00	1,088 84	9,394 28	453 02	5,355 33
1887	66	6,781	7,594	1,800 00	1,879 45	730 66	10,405 95	1,234 08	4,975 50
1892	69	8,142	8,480	1,950 00	2,105 00	875 76	12,043 54	1,472 41	6,127 46
1897	73	7,627	9,128	2,425 00	2,017 45	901 15	12,446 20	1,479 88	6,598 84
1901	78	8,372	9,221	2,525 00	1,895 00	1,110 50	13,898 79	1,404 42	7,665 12
1902	77	8,515	9,367	2,515 00	1,877 50	1,171 80	13,171 26	1,437 18	7,188 45

The County teachers' associations are doing excellent work and at a trifling expenditure. In the United States it is not unusual for Teachers' Institutes to be held for a week or longer. The work attempted is, however, somewhat like what is done in our County Model Schools.

VII. PUBLIC LIBRARIES, ART SCHOOLS, SCIENTIFIC INSTITUTIONS, ETC.

The change in the Act and Regulations requiring Annual Reports from Public Libraries to be made out to the end of each calendar year, has been complied with, and proved to be very satisfactory. The present Report is from the 1st of January to the 31st of December, 1902.

The following extracts are from the Superintendent's Report:

1. Public Libraries.

Abstract showing the Counties and Districts in which Public Libraries are established:—Addington (6), Algoma (13), Brant (7), Bruce (25) Carleton (9), Dufferin (10), Dundas (10), Durham (4), Elgin (12), Essex (8), Frontenac (6), Glengarry (3), Grenville (12), Grey (21), Haliburton (2), Haldimand (11), Halton (5), Hastings (8), Huron (18), Kent (13), Lambton (16), Lanark (13), Leeds (8), Lennox (2), Lincoln (9), Manitoulin Island (3), Middlesex (14), Muskoka (6), Nipissing (5), Norfolk (6), Northumberland (8), Ontario (12), Oxford (14), Parry Sound (12), Peel (14), Perth (8), Peterborough (5), Prescott (1), Prince Edward (2), Rainy River (2), Renfrew (9), Russell (2), Stormont (10), Simcoe (19), Victoria (12), Waterloo (14), Welland (9), Wellington (17), Wentworth (10), York (23).

Abstract showing the Progress of Public Libraries from 1883 to 31st December, 1902.

Year.	Libraries reporting.	Number of members.	Number of evening classes.	Number of pupils.	Number of reading rooms.	Number of newspapers and periodicals.	Number of volumes in libraries.	Number of volumes used.	Total receipts.	Total assets.
									$ c.	$ c.
1883 (April)	93	13,672	28	1,758	59	1,540	154,093	251,920	59,716 00	225,190 00
1888 "	167	32,016	41	1,102	104	3,041	311,048	744,466	103,843 68	403,573 75
1893 "	255	84,088	41	1,117	156	4,745	510,326	1,415,867	160,556 26	685,412 17
1898 "	347	111,208	2	79	200	5,834	789,082	2,358,140	188,783 21	870,167 54
1899 "	364	121,397	2	35	200	5,839	862,047	2,547,131	193,421 20	935,975 81
1899 (December)	371	129,713	2	47	188	5,773	918,022	2,042,904	178,642 87	966,667 38
1900 "	389	147,208	2	35	186	5,971	989,050	2,534,711	210,635 49	1,024,300 14
1901 "	415	155,361	1	19	194	6,062	1,066,117	2,668,364	225,796 29	1,080,601 71
1902 "	446	172,792	.....	.....	191	6,044	1,140,392	2,738,590	246,315 29	1,151,877 04

446 Public Libraries (140 Free, 306 Not Free) reported for the year ending 31st December, 1902. .

35 Public Libraries did not report for the year ending 31st December, 1902.

7 Libraries, which have not yet reported, were established in the year 1903.

2. Art Schools, Etc.

The following abstract shows the number of certificates awarded to Art Schools, Ladies' Colleges, Public and High Schools, etc., for drawing, painting, etc., at intervals since 1883:

Year.	Number of Art Schools, etc.	Primary Art Course.		Advanced Art Course.		Mechanical Art Course.		Industrial Art Course.	Extra subjects.
		Proficiency certificates.	Full teachers' certificates.	Proficiency certificates.	Full teachers' certificates.	Proficiency certificates.	Full teachers' certificates.	Proficiency certificates.	Paintings, etc.
1883	1	124	.....	31	.....	1	.....	.....	.....
1888	57	2,977	133	151	9	50	2	24	108
1893	85	4,753	220	301	13	139	10	11	165
1898	55	3,166	149	540	18	42	.....	30	171
1899	62	3,993	160	499	22	75	.....	42	154
1900	47	3,130	130	367	17	53	.....	43	156
1901	57	2,548	29	413	13	70	1	31	142
1902	65	1,974	41	280	10	57	.....	31	151
1903	67	2,675	38	187	3	24	.....	24	148

3. Literary and Scientific Institutions.

These Institutions are doing good work. (See Superintendent's Report.) They have Libraries of Books relating to Arts and Science, History, etc., and several of these Institutions have Museums, which are frequently thrown open Free to the public. They give popular lectures on Science and Art, History, Literature, etc., and publish their Annual Transactions. Their chief aim is to encourage higher education among the masses, and the amount of patronage they receive is a proof that their efforts are appreciated.

GENERAL REMARKS.

I.—KINDERGARTENS.

As will be seen from Table N, page 56, the kindergartens have taken a firm hold in this Province. The system was first introduced into Ontario in 1882, and made part of the school system of the Province by the Public Schools Act as amended in 1885. Kindergartens were in operation in 1902 in the cities of Brantford, Chatham, Guelph, Hamilton, Kingston, London, Ottawa, Stratford and Toronto, in the towns of Aylmer, Berlin, Cobourg, Dundas, Galt, Hespeler, Ingersoll, Niagara Falls, Owen Sound, Peterborough, Preston, Simcoe, Tillsonburg, Toronto Junction and Waterloo, and in the village of Ashburnham. Wherever kindergartens have been properly established, they have met with much favor. The principles of Froebel are now recognized as sound by nearly all leading educationists. It is well known that instruction in the kindergarten is presumed to be given on sound pedagogic principles. The success of a school of this kind largely depends upon the zeal and training of the kindergartner. Dr. W. T. Harris, United States Commissioner of Education, has been for a long time one of the strongest advocates of the kindergarten idea. In a recent issue of The Kindergarten Review he shows the great value of these schools in the following language:

"We claim for the kindergarten a superiority over the old methods used in the first two years of the primary school as an introduction of the pupils to the work of the school and the college. In the home the child has completed that part of his life which we call the stage of nurture he receives in the institution of the family. He now has arrived at the time when it is best for him to spend some portion of his day in social life with children of his own age, brought together from many families in his own neighborhood. He is to get the valuable training which comes from association with his fellows, and from the efforts that he makes to master certain tasks set for him by the teacher. The kindergarten is the best system yet devised for this period of transition from the family to the full-fledged school. What may be called the discipline of the kindergarten is in the highest degree humane. It resembles the nurture of the home in which mother-love is the governing principle. It resembles the school in that it has set tasks and classification of pupils, and grading in what may be called a course of study. It varies from the course of study as usually found in the school by having what are called 'Gifts' and 'Occupations' in it. It does not come to the use of the alphabet, printed or script. The child does not learn to read in the true kindergarten. It is too abrupt a transition from the home to require the child to learn a new language, the language addressed to the eye instead of a language addressed to the ear, and to become eye-minded instead of ear-minded at the age of four or five years. The age of seven years is the best time for beginning the art of reading.

"There are two classes of children in our American community which need the kindergarten more than other children. Indeed, I may say that while the kindergarten is excellent for all children of the age of four, five or six years, the kindergarten is really essential for the salvation of the children of the two classes which I will describe. The first class includes the children of the slums, that is to say the children of the three weakling classes of society. There is the weakling in thrift, who lives in a home of poverty and squalor. His children suffer for nutritious food, decent clothing and properly warmed rooms; they suffer for want of cleanliness, and, worse than all, they grow up without sufficient self-respect. The moral weaklings are those

which have been brought up in criminal households and associations, and have not formed moral ideas or standards of opinion. Still another variety of this class is the weakling in intelligence, the child with some degree of imbecility. Perhaps the imbecility may be due to some defect in his ability to master some of the branches of the course of study.

"The kindergarten, with its powerful system of nurture, makes easy the path of one of these weaklings to come to self-respect, to come to moral ideals, to industry, and to perseverance which conquers its natural obstacles. The kindergarten on this side proves a true blessing to the community, preparing the child with great success for a helpful participation in civilized modes of living.

"But there is another class to be saved. It is a still more important work for the kindergarten, in the United States, at least, to prepare the precocious children who are born into families of the newly rich for a life helpful to civilization. The children of fathers and mothers who have great directive powers—great power to make combinations, combinations of things into machines, combinations of men and women in the industries of life—these persons of directive power gain wealth and they rise from comparatively low positions in society to high and influential positions. But it is in the change of social position that the child of the family suffers. He cannot claim that portion of the time of his parents that the ordinary child claims, and he does not get his due portion of what we call nurture. When the mother is busy readjusting herself to the demands of a higher social order, she encounters the danger of neglecting her family. She entrusts the work of bringing up her children to servants, nurses, or governesses. In this country the children very often inherit the directive power of their parents, and, inasmuch as in our social life it is difficult to find servants or indeed governesses who have great directive power, the child is apt to get some power of control over the will of the governess and exercise that control tyrannically, and for his own injury. He is apt to become wilful and capricious in his temperament, and slothful and uncertain in his habits of study, and altogether an unmanageable pupil in school. Later on he comes to ruin in his early manhood, and the most previous human possibilities go to wreck. The loss from this source in the United States is very great."

"The public kindergarten is a new school for most of the few communities that have adopted it. Established first in Boston and Cambridge at private expense for public use, to test its claim to public approval, in each case it won such approval, and was in time made part of the public school system. Other towns and cities have gradually adopted the kindergarten in tentative ways. Like all new things, it has to stand the ordeal of serious questionings as to its utility by those who do not comprehend its philosophy, and as to its expediency by those who do. It is hardly practicable in rural communities, outside of the villages, since the children are few and widely separated, and the dominant attitude towards innovations is often one of skepticism. And where the kindergarten is thought well of, and would otherwise be a most welcome addition to the school system, the additional expense it would mean leads the school authorities to shrink from its adoption. There is no question as to its value among those who have studied its philosophy. It takes children at their most impressible age; it moulds them through the agency of their interests, which are respected, and their activities, which are judiciously directed; it leads them into habits of right conduct; it favors right attitudes of mind and heart towards the world of persons and things; in brief, it is pre-eminently a school for training in manners and morals. And all this makes its blended play and

work an admirable preliminary to the more formal instruction that comes after. This formal instruction has already been sweetened, vitalized and made more natural by the kindergarten, where it exists; and even where it does not exist, its distant influence is felt. In all the normal schools, kindergartens are maintained, that intending teachers in general may become familiar with their spirit and methods."—Massachusetts Report.

II.—THE LEGISLATIVE GRANTS TO PUBLIC SCHOOLS.

The entire Legislative aid to Public and Separate Schools amounted to $383,666. Of this sum $149,844 is paid to urban municipalities, $46,195 to schools in the districts, and $187,627 to rural schools in the counties. Except in the districts, the appropriation made by the Legislature is divided among the various municipalities on the basis of population. The amount to which each township is thus entitled is divided among the different school sections upon the basis of the average attendance. I am satisfied the present mode of distributing the Legislative grant should be superseded by some plan which will encourage trustees to employ teachers of higher qualifications. In none of the other Provinces is the system adopted in Ontario followed. So far as I have been able to ascertain, also the different States of the American Union have adopted different systems. At one time the basis of average attendance had advantages in promoting the regular attendance of pupils. I doubt if the sum received by a school section has that effect at the present time.

Section 7 of the Education Department Act should, I think, be amended so as to allow the payment of grants to rural schools to be made on a different basis. The main factor in determining the amount to be paid a school section should be the qualifications of the teacher. A school section which has not the necessary accommodation or equipment or where the schoolhouse is not kept in a proper sanitary condition, should receive no grant, or at least a diminished amount. I need scarcely say that the efficiency of the school depends almost entirely upon the qualifications of the teacher, and any method which will secure better teachers for our schools is deserving the earnest attention of the public.

The case of weak schools is partly met by the provisions of the Public Schools Act, requiring the minimum municipal grant of $150 to each section, and also by grants from the Poor School Fund. Any further assistance to weak schools should be dealt with by this section of the Statute. In other words, the efficiency of the school should be kept distinct from the financial weakness of the section in the distribution of the Legislative grant.

"The law relating to the State reimbursement of the advance in salaries of teachers of exceptional ability has been in operation more than six years. The practical working of the law during this time, and especially during the part two years, has been all that the promoters of the law could expect. Indeed, I doubt if an equal sum of money has ever been expended by the State to greater advantage to the schools of country towns than has attended the carrying out of this law. To my personal knowledge, the schools of more than one town have been entirely revolutionized by it. Towns which have heretofore thought themselves unable to pay more than six or seven dollars a week for teachers have been induced by the prospect of securing the desired aid from the State to pay one dollar or two dollars a week more, and thereby have been able to engage the services of graduates of normal schools and of colleges, instead of young and inexperienced teachers."—Massachusetts Report.

III.—CONTINUATION CLASSES.

In 1903 the total number of Continuation Classes receiving Legislative aid was 480. Of these 65 were in grade A, 48 in grade B, 134 in grade C, and 233 in grade D. The total number of pupils enrolled was 4,864, and the number of teachers employed in Continuation Class work was 501. The grants for each school in these grades were: A, $100; B, $50, C, $25, and D, $15. The sum of $200 was paid to a school in grade A, if two teachers were employed, and $300 if three teachers were engaged. These appropriations require the County Council to give an equivalent. In some places the County Councils—to their credit be it said—have gone beyond the minimum requirements. The trustees of Continuation Classes are anxious to employ teachers of high qualifications. In 1903, 26 teachers holding degrees in Arts from the Universities were employed. There were 84 holding First Class certificates, and 218 Second Class certificates. These institutions are doing an excellent work for the Province.

IV.—HIGH SCHOOLS.

The growing efficiency of our High Schools and Collegiate Institutes is well known. The statistical tables show marked evidence of progress. This is true not only as regards the attendance of pupils and the qualifications of teachers, but also as regards the expenditure from local sources. During the year a new High School was established at East Toronto, and Vankleek Hill High School has just been raised to the status of a Collegiate Institute. Owing to the organization of Continuation Classes in the Public Schools, there has not been much increase of late years in the establishment of additional High Schools. It is desirable, however, that where there exists a Continuation Class with two duly qualified teachers, an effort should be made by the town or village to establish a High School. This has been done in the case of Rat Portage, Sault Ste. Marie, and North Bay; and the establishment of one at Chesley, which has three teachers in its Continuation Class, is contemplated. Many Continuation Classes are really doing High School work, and it has been urged that they might be brought under the same provisions of the law as High Schools. The total number of High Schools now in operation is 94, and of Collegiate Institutes, 41.

The number of pupils attending High Schools and Collegiate Institutes in 1902 shows an increase over the previous year, of 1,949. The total expenditure for High Schools was $41,547 more than in 1901. The cost per pupil was, however, 88 cents less, owing to the increased attendance. The average salary for Principals was $1,198, and for Assistants, $857. The highest salary paid a Principal in 1903 was $2,800, and the lowest, $750. The highest salary paid an Assistant was $1,800, and the lowest $375. Of the 593 teachers engaged, 474 are University graduates. A considerable increase is noticed in the number of pupils who left these schools to enter mercantile life, and as in former years, the number who left for agricultural pursuits is large.

The number of schools charging fees was 82, which shows a decrease of three. This decrease would be gratifying if it were much larger. As I pointed out in previous reports, the spirit of the age is in favor of free education, not only for Public Schools, but for High Schools. In the eastern, northern and middle States of the American Union, every High School is free, and the exaction of fees would not be thought of. May we not hope that a more liberal view on the question of free secondary schools will in future prevail? If the resources of our country are to be developed, we must see to it that all

classes of the community have good educational advantages. The old theory that the High Schools are institutions for the education of the wealthy and for the professions should be abandoned. The adoption years ago of courses of study to meet the claims of the humbler callings in life has done much to popularize our High Schools. The proposed courses of study will still increase this popularity, and result, I believe, in more liberal grants by municipalities to High Schools.

V.—TEXT BOOKS.

In the early days of our educational system difficulties were presented in dealing with this question that have now largely disappeared. When Dr. Ryerson laid the foundations of our system, it was necessary, on grounds of efficiency and economy, to select competent persons to prepare suitable text-books in the different subjects and to arrange for their publication. This policy was necessary in view of the small number of scholars in the teaching profession, and in view of the limited constituency whose wants were to be supplied. Even when a competent author could be decided upon, no publisher would undertake the necessary expense unless he had the promise of authorization. The educational development of the Province has made it possible and desirable of late years to depart from the line of policy found necessary at one time, and I made up my mind a year ago that a clearly defined change would be desirable in the interests of the High and Public Schools.

In the authorization of text-books, the interests of authors, publishers and pupils are affected. I deem it unnecessary to say that the public interests, which are the interests of the pupils, should have paramount consideration. The author or the publisher must take any necessary risk in the preparation and publication of each new text-book. The suitability of a text-book can be best decided by teachers. The profession, therefore, should have the opportunity for at least six months to form an opinion regarding the character of the work proposed for authorization. I am aware that there are some advantages arising from the selection of the author. A teacher of recognized scholarship and professional experience will be likely to prepare a good book. As everyone who has had experience in dealing with the question knows, a poor text-book may, however, be brought out by one who is both an acknowledged scholar and teacher of recognized ability. If a book has been for some time before the country, the criticism to which it will be subjected, if faulty, is sure to be of advantage in dealing with the application for its authorization. Unless there is a need for a change of the authorized text-book in a subject, and unless the opinions of teachers favor the authorization no action is taken by the Department. If, however, there is a demand for of the new book, no action is taken by the Department. If, however, there is a demand for another book, the proposed work may be submitted to a Committee of the Educational Council, whose judgment will be of great value in a question of this kind.

The announcement of this policy has, I believe, met with general approval. Doubtless it may not be acceptable to a publisher who wishes to have a promise from the Department for the authorization of a book. I recognize the risk which both the author and publisher must take. It will be acknowledged, however, that the time has arrived when each text-book must stand on its own merits as regards authorization, when the interests of the pupils in our High and Public Schools are to be considered. I believe the result will be that no change will be made in a text-book until one is placed on the market which is in every respect a far better book.

The new provisions relating to authorization will be found on page 98 of this Report.

VI.—TRAVELLING LIBRARIES.

The establishment of Travelling Libraries in 1901 has been attended with satisfactory results. These Libraries are intended to meet the wants of new and sparsely-settled districts in Northern Ontario. In most instances they have been taken advantage of by the men working in the lumber or mining camps. As the operations of mining and lumbering are usually carried on at a considerable distance from villages or well-settled country districts, the persons engaged in these operations would have difficulty in securing desirable reading matter. Since their establishment, 31 Travelling Libraries have been sent out, in each case containing fifty books. The entire number of books thus placed in circulation is 1,550. The cases are marked A, B, C, etc. The additional places reached in 1903 are: Bancroft, Cutler, Gold Rock, Huntsville, Markstay, Massey Station, Nairn Centre, Orrville, Parry Sound, North Bay, Rat Portage, Searchmont, Superior Mine.

The following is a list of the books sent during the year:

CASE T.

Adam Bede, Vol. I, II, (Eliot.)
The Antiquary, (Scott).
Barrack-Room Ballads, (Kipling).
The Battle of the Strong, (Parker).
British Columbia, 1887, (Lees and Clutterbuck).
A Cathedral Courtship, (Wiggin).
The Cavalier, (Cable).
The Choir Invisible (Allen).
Eight Years in Ceylon, (Baker).
The First Crossing of Greenland, (Nansen).
Food and Feeding, (Thompson).
Gulliver's Travels, (Gulliver).
The Hosts of the Lord, (Steel).
The House of Seven Gables, (Hathorne).
How England Saved Europe, (Fitchett).
In the Paths of Peace, (Barry).
James Hogg, (Douglas).
The Jessamy Bride, (Moore).
Kirkcaldy of Grange, (Barbe).
Lincoln in History, (Pratt).
Marie Antoinette, (Tytler).
The Monastery, (Scott).
My Dogs of the Northland, (Young).
Norman McLeod (Wellwood).
The Old Curiosity Shop, Vol. I, II, (Dickens).
Oceaña, (Froude).
The Opium Easter, (De Quincey).
Penelope's Experiences in Scotland, (Wiggin).
Plain Tales from the Hills, (Kipling).
The Playground of Europe, (Stephen).
Poems, Vol. II, (Eliot).
The Potter's Thumb, (Steel).
Prue and I (Curtis).
"Quo Vadis," (Sienkiewicz).
Roden's Corner, (Merriman).
The Ruined Castles of Mashonaland, (Bent).
The Seats of the Mighty, (Parker).
Sir Richard Whittington, (Besant).
Sketches by Boz, (Dickens).
The Story of Creation, (Clodd).
A Tale of Two Cities, (Dickens).
Ten Months in the Fijii Islands, (Smythe).
The Tents of Shem, (Allen).
Thomas Reid, (Fraser).
To Have and to Hold, (Johnston).
The Trail of the Sword, (Parker).
Where the Sugar Maple Grows, (Teskey).
When Knighthood Was in Flower, (Caskoden).

CASE U.

Agriculture, (James).
Auld Licht Idylls, (Barrie).
The Benefactress.
Black Rock, (Connor).
The Blackwood Group, (Douglas).
The Banner of Blue, (Crockett).
Bride of Lammermoor, Count Robert of Paris, (Scott).
Captains Courageous, (Kipling).
The Cavalier, (Cable).
The Choir Invisible, (Allen).
The Cruise of the Alerte, (Knight).
The Fight With France for North America, (Bradley).
Grandfather's Chair, (Hawthorne).
The Heart of Midlothian, (Scott).
The Holy Roman Empire, (Bryce).
Howitt's Visits to Remarkable Places. (Howitt).
The Inn of the Silver Moon, (Viele).
In the Paths of Peace, (Barry).
In Old Virginia, (Page).
Jackanapes, (Ewing).
Johnston of Warriston, (Morrison).
Kaiadac, Cout of Gersay, (Pritchard),
Kim, (Kipling).
Lazarre, (Catherwood).
Les Miserables, Vol. I, II, (Victor Hugo).
A Little Book of Profitable Tales, (Field).
The Loyalists in the American Revolution, (Van Tyne).
Martin Chuzzlewit, Vol. I, II, (Dickens).
My Dogs in the Northland, (Young).

A Nest of Linnets, (Moore).
New France and New England, (Fiske).
No Thoroughfare, (Dickens).
The Portion of Labor, (Dickens).
Penelope's Irish Experience, (Wiggin).
The Right of Way, (Parker).
The Seats of the Mighty, (Parker).
Seven Seas, (Kipling).
The Son of the Czar, (Graham).
Spanish John, (McLennan).
A Thoroughbred Mongrel, (Townesend).
The Turn of the Road, (Frothingham)
With Roberts to Pretoria, (Henty).
Where Three Empires Meet, (Knight).

FRENCH BOOKS.

La Cousine Bette, (De Balzac).
Le Cousin Pons (De Balzac).
Les Navigateurs Du XVII, Siecle, Vol I, II, (Verne).

CASE V.

The Abbot, (Scott).
The Battle of the Strong, (Parker).
Christmas Stories, (Dickens).
Commonwealth or Empire, (Smith).
Concerning Isabel of Carnaby, (Fowler).
The Day's Work, (Kipling).
Dombey and Son, (Dickens).
Donovan Pasha, (Parker).
The Golden Age, (Graham).
Green Heroes. (Kingsley).
Humours of '37, (Lizars).
Irrigation and Drainage, (King).
Lazarre, (Catherwood).
The Life and Work of Dwight Moody, (Chapman).
The Little White Bird, (Barrie).
Lord Strathcona, (Willson).
Love Letters of Victor Hugo.
Mr. Chupes and Miss Jenny, (Bignall).
Nicholas Nickelby, (Dickens).
The Poetry of Tennyson, (Van Dyke).
Perveril of the Peak, The Pirate, (Scott).
Reflections of a Married Man, (Grant).
The Right of Way, (Parker).
Roden's Corner, (Merriman).
A Short History of the English People, Vol. I, II. (Green).
Sketches of Irish Character, (Hall).
Society and Solitude, (Emerson).
Soldiers Three, (Kipling).
Some Experience of an Irish R. M. (Somerville).
The Sowers, (Merriman).
Stalky & Co., (Kipling).
The Story of Creation, (Clodd).
Three Years in Savage Africa, (Decle).
The Tribulations of a Princess).
The Victors, (Barr).
We and the World, (Ewing).
Yesterday, To-day and Forever), (Bickersteth).
Cesar Birotteau, (De Balzac).
Le Comte De Monte-Cristo, Vol. I, II, (Dumas).
Les Miserables, Vol. I, II, (Victor Hugo).
Michael Strogoff, Vol. I, II, L'Ile A Helice, Vol. I, II, Voyage Au Centre De La Terre, (Verne).

CASE W.

The Abandoned Farmer, (Preston).
Adventures of Sherlock Holmes, (Doyle).
The Benefactress.
Ben-Hur, (Wallace).
Bleak House, (Dickens).
Burlesques, (Thackeray).
The Cavalier, (Cable).
A Chosen Few Short Stories, (Stockton).
A Clear Type Dictionary.
A Flat Iron for a Farthing, (Ewing).
From Sea to Sea, Vol. I, II, (Kipling).
In the Wasp's Nest, (Brady).
The Kembles, (Matthews & Hutton).
Khan's Canticles, (Kerninghan).
The Lane That Has No Turning, (Parker).
The Life of the Bee, (Macterlinck).
Life's Handicap, (Kipling).
A Little Book of Profitable Tales, (Field).
Little Doritt, (Dickens).
The Little White Bird, (Barrie).
Little Women, (Alcott).
Lorna Doone, (Blackmore).
The Man That Laughs, (Victor Hugo).
Marguerite De Roberval, (Marquis).
The Naulahka, (Kipling).
Ninety-three, (Victor Hugo).
Old Creole Days, (Cable).
Old Mortality, (Scott).
Poetical Works, (Heamans).
A Primer on Psychology, (Fitchener).
The Rear Latin Quarter, (Smith).
The Right of Way, (Parker).
Rob Roy, (Scott).
The Romance of Canadian History. (Parkman).
Romney of the Snows, (Parker).
Sartor Resartus, (Carlyle).
Sea Fights, (Frothingham).
Sketches of Irish Character, (Hall).
Sparrow the Tramp, (Wesselhoeft).
Stories of Invention, (Hale).
Suspense, (Merriman).
A Tale of Two Cities. (Dickens).
Toilers of the Sea, (Victor Hugo).
Vanity Fair, (Thackeray).
The Virginians. (Thackeray).
What Katy Did (Coolidge).
A Window in Thrums, (Barrie).
Woodstock, (Scott).
Yesterday, To-day, and Forever, (Bickersteth).

CASE X.

Bittersweet, (Holland).
The Benefactress.

The Clear Type Dictionary.
Barnby Rudge—Edwin Drood, Curiosity Shop—Hard Times, David Copperfield, Martin Chuzzlewit, Nicholas Nickelby, Our Mutual Friend, Oliver Twist—Pictures from Italy, Pickwick Papers, (Dickens).
Donovan Pasha, (Parker).
Dream Life, (Marvel).
The Life and Work of Dwight Moody, (Chapman).
Captain Courageous, Departmental Ditties and Ballads, The Light That Failed, Plain Tales from the Hills, The Second Jungle Book, Under the Deodars, (Kipling).
The Life of the Bee, (Maeterlinck).
The Life of the Emperor Frederick, (Von Poschinger).
Matthew Arnold, (Paul).
Notre Dame, (Victor Hugo).
Nugent's French and English Dictionary, (Brown & Martin).
Opinions of a Philosopher, (Grant).
Russian Hosts and English Guests in Central Asia, (Perowne).
Through New Guinea, (Carley-Webster).
The True American Revolution, (Fisher).
Ivanhoe, Kenilworth, Marmion, Quentin Durward, The Talisman, Waverley, (Scott).
Pendennis, Philip-Catharine, (Thackeray).

FRENCH BOOKS.

Germinal, (Zola).
La Reine Margot, Vol. I, II, (Dumas).
Les Miserables, 3 Vols., (Victor Hugo).
Les Martyrs, Vol. I, II, Les Natchez, Vol. I, II, (De Chateaubriand).
Les Premiers Exploateurs, Vol. I, II, La Tour Du Monde, (Verne).

CASE Y.

Around the World in Eighty Days, (Verne).
Barnaby Rudge, (Dickens).
Ben-Hur, (Wallace).
Black Beauty, (Sewall).
The Black Dwarf, (Scott).
Black Rock, (Connor).
Bonnie Prince Charlie, By England's Aid, (Henty).
Canadian History, (Weaver).
Cast Up by the Sea, (Baker).
Charles O'Malley, (Lever).
Cleg Kelly, (Crockett).
The Deerslayer, (Cooper).
Dombey and Son, (Dickens).
Donovan, (Lyall).
From Powder Monkey to Admiral, (Kingston).
German Life in Town and Country, (Dawson).
The Gorilla Hunters, (Balantyne).
His Brother's Keeper, In His Steps, (Sheldon).
In King's Byways, (Weyman).
Jacob Faithful, (Marryat).
John Halifax, Gentleman, (Mulock).
Kenilworth, (Scott).
My Boys, (Alcott).
The Mysterious Island, (Verne).
The Old Curiosity Shop, Our Mutual Friend, (Dickens).
The Pathfinder, (Cooper).
Peter Simple, (Marryat).
Peter the Whaler, (Kingston).
The Pilgrim's Progress, (Bunyan).
The Pilot, (Cooper).
Plain Tales from the Hills, (Kipling).
Robinson Crusoe, (Defoe).
Rob Roy, (Scott).
The Sky Pilot, (Connor).
Soldiers Three, (Kipling).
The Swiss Family Robinson, (Wyss).
The Talisman, (Scott).
Ten Nights in a Bar-room, (Arthur).
The Three Guardsmen, (Dumas).
Titus, A Comrade of the Cross, (Kingsley).
Tom Brown's School Days, (Hughes).
Twenty Thousand Leagues Under the Sea, (Verne).e
Uncle Tom's Cabin, (Stowe).
Under Crescent and Star, (Haggard).
The Vicar of Wakefield).
With Clive in India, With Wolfe in Canada, (Henty).

CASE Z.

Around the World in Eighty Days, (Verne).
By England's Aid, (Henty).
Black Beauty, (Sewall).
Black Rock, (Connor).
Ben-Hur, (Wallace).
Bonnie Prince Charlie, (Henty).
The 2Birds' Christman Carol, (Wiggin).
Canadian History, (Weaver).
Charles O'Malley, (Lever).
Cast Up by the Sea, (Baker).
The Deerslayer, (Cooper).
A Double Barrelled Detective Story, (Twain).
Donovan, (Lyall).
Friends, Though Divided, (Henty).
From Powder Monkey to Admiral, (Kingston).
The Gorilla Hunters (Ballantyne).
Great Expectations, (Dickens).
His Brother's Keeper, In His Steps, (Sheldon).
Jacob Faithful, (Marryat).
Life's Handicap, The Light That Failed, (Kipling).
Lovey Mary, (Rice).
Many Inventions, (Kipling).
The Mysterious Island, (Verne).
Old Curiosity Shop, (Dickens).
Old Mortality, (Scott).
Peter Simple, (Marryat).
Peter the Whaler, (Kingston).

Pickwick Papers, (Dickens).
The Pilgrim's Progress, (Bunyan).
The Pathfinder, The Pilot, (Cooper).
Robinson Crusoe, (Defoe).
The Sky Pilot, (Connor).
The Swiss Family Robinson, (Wyss).
Ten Nights in a Bar-room, (Arthur).
Titus, (Kingsley).
Tom Brown's School Days, (Hughes).
Twenty Thousand Leagues Under the Sea, (Verne).

FRENCH BOOKS.

Eugenie Grandet, (De Balzac).
Graziella, (De Lamartine).
Le Comte de Monte-Cristo, 6 Vols., (Dumas).
Le Medecin de Campagne, (De Balzac)
Port-Tarascon, (Daudet).

CASE A1.

The Banner of Blue, (Crockett).
The Bird's Christmas Carol, (Wiggin).
A Captured Santa Claus, (Page).
Castle Creanycrow, (McCutcheon).
Cranford, (Caskell).
Darkest Africa, Vol. I, II, (Stanley).
David Harum, (Westcott).
Flower Legends, (McCollum).
Gibbon's Roman Empire, 5 Vols.
Hugh Wynnee, (Mitchell).
Hypatia, (Kingsley).
Jane Eyre, (Bronte).
John Halifax, (Mulock).
The Jungle Book, The Second Jungle Book, (Kipling).
Last Days of Pompeii, (Lytton).
The Little White Bird, (Barrie).
Lovey Mary, (Rice).
Macaulev's Essays, 3 Vols.
Martyrdom of an Empress.
Mrs. Wiggs of the Cabbage Patch, (Hegan).
Old Mortality, (Scott).
The Refugees, (Doyle).
The Right of Way, (Parker).
The Romance of Canadian History, (Edgar).
The Sacrifice of the Shannon, (Hickman).
Sketches of Irish Character, (Hall).
Tales from Blackwood, 5 Vols.
No Thoroughfare, (Fraser).
Three Years' War, (DeWet).
To the End of the Trail, (Mason).
The Two Vanrevels, (Tarkington).
Vansittert Memoirs, (Cameron).
Vicar of Wakefield, (Goldsmith).
Woodstock, (Scott).
With Clive in India, With Wolfe in Canada, The Young Colonists, the Young Franc Tireurs, (Henty).

CASE B1.

The Birds' Christmas Carol, (Wiggin).
Bozland, (Fitzgerald).
Happiness, (Hilty).
Ivanhoe (Scott).
Our Neighbors, (MacLaren).
The Romance of Canadian History, (Edgar).
Sketches of Irish Character, (Hall).
Tales from Blackwood. Vol, VI, VII, VII, IX, X, XI, XII.
Thoroughbreds, (Fraser).
The Turquoise Cup, (Smith).
Weverley, (Scott).
With the British Legion, (Henty).
American Notes, Barnaby Rudge, Bleak House, Christmas Books, Christmas Stories, Dombey and Son, Great Expectations, Letters, 1833-1870, Little Dorrit, Martin Chuzzlewit, Nicholas Nickelby, Pickwick Papers Old Curiosity Shop, Oliver Twist, Our Mutual Friend, Reprinted Pieces, Sketches by Boz, A Tale of Two Cities, The Uncommercial Traveller, (Dickens).

FRENCH BOOKS.

Grands Voyages et Grands Voyageues, Vol. I, II, III, IV, V, VI, (Verne).
Impressions De Voyage en Russie, Vol. I, II, III, IV, (Dumas).
Vingt ans Apres, Vol. I, II, III, (Dumas).

CASE C1.

The Abbot, Anne of Geirstein, The Antiquary, The Betrothed, The Bride of Lammermoor, Count Robert of Par is, The Fair Maid of Perth, The Fortunes of Nigel, The Heart of Midlothian, The Monastery, Pervil of the Peak The Pirate, Quentin Durward, The Red Gauntlet, St. Ronan's Well, Waverley, (Scott).
The Amateur Cracksman, (Hornung).
Baxter's Second Innings, (Drummond).
The Benefactress.
The British Navy, (Stenzel).
The Birds' Christmas Carol, (Wiggin).
The Call of the Wild, (London).
Capt. Macklin, (Davis).
Castle Omeragh (Moore).
Cherry, (Booth Tarkington).
Child's History of England, (Dickens).
A Doffed Coronet.
Elizabeth's Children.
First Principles of Nursing, (Manning).
The Five Nations, (Kipling).
Gems of Hope, (Bate).
Glengarry School Days, (Connor).
House Decorating and Painting, (Brown).
John March, Southerner, (Cable).
King Mombo, (Du Chaillu).
Kit Kennedy (Crockett).
Kronstadt, (Pemberton).

The Lady of the Barge, (Jacobs).
Martyrdom of an Empress.
Letters to Dead Authors,. (Lang).
Our Neighbors, (MacLaren).
The Road to Frontenac, (Merwin).
Robert Urquhart, (Setoun).
The Romance of Canadian History, (Edgar).
The Story of My Life, (Keller).
The Tragedy of the Korosko, (Doyle).
The Traitor's Way. (Levett-Yeats.)
Uncle Bernac, (Doyle).
The Virginian, (Wister).
The Young Buglers, (Henty).

CASE D1.

Along Four-footed Trails, (Cook).
American Notes, (Dickens).
Baxter's Second Innings, (Drummond).
The Black Dwarf, (Scott).
Bozland. (Fitzgerald).
The British Navy, (Stenzel).
Canon Barnett, (Aitken).
A Child's History of England, (Dickens).
Careers of Danger and Daring, (Moffatt).
Col. Carter's Christmas, (Smith).
Cranford, (Caskell).
A Day With a Tramp, (Wyckoff).
The Descendant.
Dorothy South, (Eggleston).
Elizabeth and her German Garden.
England in Egypt, (Milner).
A Galloway Herd, (Crockett).
Guy Mannering, (Scott).
Hard Times, (Dickens).
Hilda Strafford, (Harraden).
Kenilworth, (Scott).
Khan's Canticles, (Kernighan).
Lady Rose's Daughter, (Ward).
Les Miserables, (Hugo).
Let Us Follow Him, (Sienkiewicz).
Lincoln, (Leland).
Little Rivers, (Van Dyke).
Maida and Matrons of New France, (Pepper).
Marjorie, (McCarthy).
Nicholas Nickelby, Old Curiosity Shop, (Dickens).
The Phantom Future, (Merirman).
The Pilgrim's Progress. (Bunyan).
Pride and Prejudice. (Austin).
Quentin Durword. (Scott).
The Refugees, (Doyle).
Robinson Crusoe, (Defoe).
Rob Roy, (Scott).
Romance of Canadian History, (Edgar).
Seas and Lands, (Arnold).
A Solitary Summer.
The Sowers, (Merriman).
Swiss Family Robinson.
Tales of the Punjab, (Steel).
Thompson's Progress, (Hyne).
The Virginian, (Wister).
Wee Macgregor, (Bell).
When Valmond Came to Pontiac, (Parker).
The Whirligig, (Lindsay).
The Young Barbarians, (MacLaren).

CASE E1.

Bar, Stage and Platform, (Merivale).
Baxter's Second Innings, (Drummond).
The Blakes and the Flanagans, (Sadlier).
R. J. Campbell, (Bateman).
Careers of Danger and Daring, (Moffatt).
In Darkest Africa, Vol. I, II, (Stanley).
From the Ranks, (King).
History of Our Own Times, Vol. I. II. (McCarthy).
Great Expectations, Martin Chuzzlewit. (Dickens).
The Kentons, (Howells).
Life of Wm. McKinley, (Halstead).
The Mission to Uganda. (Portal).
McGee's Poems, (McGee).
The Pharaoh and the Priest, (Curtin).
The Pilgrim's Progress, (Bunyan).
The Reveries of a Bachelor. (Marvel).
Romance of Canadian History, (Edgar.)
Some Experiences of an Irish R. M., (Somerville and Ross).
The Success of Mark Wyngate, (Silberrad).
Swiss Family Robinson.
Three Years' War. (DeWet).
Wee Macgregor. (Bell).
Lady Susan, Mansfield Park, Northanger, Sense and Sensibility, (Austin).
American Notes, In Black and White, Mine Own People. The Phantom Rickshaw, Soldiers Three. The Story of That Gadsbys, Wee Willie Winkle, (Kipling).
The Abbot, Anne of Geirstein, The Betrothed, Count Robert of Paris, Guy Mannering, The Fortunes of Nigel, The Heart of Midlothian, Ivanhoe, Kenilworth, Pervil of the Peak, St. Ronon's Well. (Scott).
The Newcomes. The Paris Sketch Book, Roundabout Papers, (Thackeray).

VII.—PUBLIC LIBRARIES.

As will be seen from the statistical tables, our Public Library system has attained very large proportions. Of the 488 Public Libraries, 140 are reported as free. Thirty-five Public Libraries did not report for the year end-

ing the 31st December, 1902. Seven Libraries which have not yet reported were established in the year 1903. The decrease in the number of new Libraries is due to the wise amendment to the Libraries Act made during the last session of the Legislature.

The amendment to the Public Libraries Act made the last session of the Legislative Assembly will prevent Library Boards from going in debt in the purchase of books. The Consolidated Statutes, section 28 (1) had the following provision: "Subject to the preceding sections and to any regulations approved of by the Lieutenant-Governor in Council in that behalf, there shall be paid to every public library established under the said Act, out of any money appropriated by the Legislature for that purpose, one dollar for every dollar expended by the board of management on the purchase of books, but so as not to exceed the sum of $200, provided it is shown to the satisfaction of the Education Department that an amount at least equal to the sum so expended has been contributed by municipal or school corporations, or from the fees of members and other sources."

The Boards in many small places had been accustomed to give notes to publishers or agents in adding to the books of the Library. This interpretation of "other sources" will no longer be allowed, as will be noticed by the amendment, which reads as follows: "In estimating the amount to which a Public Library is entitled under sub-section 1 of this section, only the amounts expended by the board of management in cash payments out of moneys received by way of grant or gift or as membership fees shall be included, and no public library shall be entitled to any grant under the said sub-section by reason of the expenditure of money borrowed by the board of management or by reason of payments made in promissory notes or in any other way than by cash only."

It will be seen that in estimating the grant to which a Library Board will be entitled, only such sums as are raised by the municipal or school corporations, donations, or fees from members, can be taken into consideration.

I regret to say that of the 488 Public Libraries in Ontario, only 140 are free. The tendency to form free libraries is undoubtedly increasing, and the public sentiment is generally in favor of free public libraries on the same principles as it is in favor of free schools. The Legislature has been very liberal in the amount appropriated for library purposes. Has not the time arrived when no appropriation for library purposes. Has not the time arrived when no appropriation should be made to a library which is not free to all citizens of the municipality by which it is maintained? This would require an amendment to the Public Libraries Act, and it is one that is well deserving the consideration of those specially interested in this department of educational work.

The provisions of the statute regarding free Public Libraries work fairly well. The mode of appointing the trustees is satisfactory. In many places it has been the custom to appoint some of the teachers of the Public or High Schools as members of the Board. In a few places successful efforts have been made to meet the needs of Public and High Schools by having books selected suitable for pupils attending the schools. In many cities in the United States, methods are adopted by which books are sent regularly to the teachers of the schools for distribution. I think similar arrangements might be made with advantage in Ontario. Until school libraries are adopted in cities and towns, this plan, if followed, would be of much service.

The provisions of the law for the formation and management of free Public Libraries in urban municipalities work satisfactorily. The same cannot be said regarding the formation of libraries not free, and especially libraries in unincorporated villages. The trustees forming a library board

should, I think, represent the school section or municipality, and not the few members who become incorporated for the purpose of establishing a public library. If the public libraries in rural districts and unincorporated villages were placed under the control of the trustee board, there would be a great saving of expense, and the school board being a permanent corporation would necessarily be under greater obligation to look after the library, which would become the property of the section. The library might be placed in the school. This would save the cost of renting another building. The teacher, with some slight addition to his salary, could act as librarian, and the books might readily be distributed in many cases through the pupils of the school. Already many school libraries have been formed in rural districts. If by a change in the law, increased grants were given where additional books for adults were provided, the advantages of public libraries would become more generally distributed than at present. It is pleasing to notice the interest taken in many cities and towns in the erection of suitable buildings for library purposes. The liberality of Mr. Andrew Carnegie has doubtless largely contributed to the increased impetus for good buildings. Already Mr. Carnegie's gifts to libraries in Ontario are as follows: Berlin, $15,000; Brantford, $30,000; Chatham, $15,000; Collingwood, $10,000; Cornwall, $7,000; Galt, $17,500; Goderich, $10,000; Guelph, $20,000; Lindsay, $10,000; London, $10,000; Ottawa, $100,000; Palmerston, $6,000; Paris, $10,000; Pembroke, $10,000; St. Catharines, $20,000; St. Thomas, $15,000; Sarnia, $15,000; Sault Ste. Marie, $10,000; Smith's Falls, $10,000; Stratford, $12,000; Thorold, $10,000; Toronto, $350,000; and Windsor, $20,000.

"Although fiction is a great part of literature, it is not all; and it is scarcely necessary to say that to read fiction only, even if it be the best fiction, is to cultivate the mind unsymmetrically. What shall be said, then, of the exclusive reading of poor fiction? The circulation of popular novels has advanced by leaps and bounds of late years. Sensational methods of advertising have had some share in this, no doubt; but along with the large sales of novels has come the falling-off in the sales of other books. Any bookseller will admit that people buy fewer books of solid merit than they bought twenty years ago. Certain classics, of course, have a steady sale, though it is possible that even in their case it is diminishing. Shakespeare and the English poets are in demand for gifts, as well as for personal use; Dickens, Thackeray, Miss Austen and other novelists of assured fame are constantly being put forth in new editions. So far there is ground for congratulation. But in the case of current books of merit, in history or criticism or science, for example, the sale is often surprisingly small, especially considering the assertions constantly made as to the increasing avidity of the public for instruction. People are simply wasting their time and money in keeping up with the books which the 'literary' papers assert 'must' be read.

"It is a singular circumstance, too, that most of these novels, so highly praised, so eagerly bought, and so soon forgotten, are in no sense worth reading. Not only do they offend against the elementary canons of art, they also show the most distressing ignorance of life. 'Take up half a dozen of these novels at random,' the London Academy counsels its readers, 'and you will find misrepresentation blatant, misrepresentation of every class of society, misrepresentation of the most ordinary affairs of existence. It may not be conscious misrepresentation, but there it is: the servant girl stands in as impossible a light and as ruinous a perspective as the countless men and women who trail titles across the pages. There comes upon us at time a positive yearning for anything vital, anything truly and personally observed, were it only a sidling tramp or a garbage-sodden gutter.'

"Probably most parents would confiscate any dime novel which they found their boys perusing surreptitiously. But the dime novel does not do half the injury to youth that its lineal successor does to the adult intelligence. The demoralization wrought is so great, in fact, as to lead the most conscientious novelist with the keenest artistic insight to the point of swearing that he will forsake this form of literature, degraded as it is by fakirs. The matter is fast reaching a pitch at which the only possible advice to give will be the somewhat unjust direction to let all 'best-selling novels' alone until they have proved a claim to something else than commercial qualities."—Providence Journal.

VIII.—SCHOOL LIBRARIES.

By reference to Appendix C, page 60, it will be seen that an excellent beginning has been made in the movement for the establishment of rural school libraries. Much credit is due Public School Inspectors for the manner in which this question has been brought to the attention of trustees and teachers. It is evident only a few years will elapse before nearly all schools in country districts will be supplied with an equipment so necessary for the education of the children. The late Sir Joshua Fitch says: "Until a good library is attached as a matter of course to every one of our elementary schools, a great opportunity of refining the taste and enlarging the knowledge of the young will continue to be wasted, and the full usefulness of those institutions will remain unattained. After all it is the main business of a primary school, and a chief part of the business of every school to awaken a love of reading and to give children pleasant associations with thought of books." It is scarcely necessary for me to repeat what I pointed out in various reports, that the rural schools especially, should be furnished with suitable libraries. In country districts pupils very often have little literature in their homes, and public libraries are not always available.

The existence of a Public Library is no excuse for the neglect in establishing a school library. Books to be of most service must be readily accessible to children. If suitable books are placed in the school library, the character of the reading will be generally under the direction of the teacher. It should never be forgotten that it is of great importance to fill the mind of the child with a love for choice literature. If children are left to themselves they will not choose the best reading. The pupil who leaves our Public Schools with a love for good books is almost certain to improve his education when he enters the active duties of life. To direct pupils in the choice of reading matter is an important duty of the teacher. If books are placed in the library that furnish knowledge which is stimulating, a great deal will be accomplished.

The regulations adopted in 1902 for the establishment of school libraries have worked well. In many places the trustees have been assisted by private contributions. Although an expenditure of $20 secures the maximum Legislative grant ($10), many trustees have expended double that sum. When a library is once established, the School Board should make additions year by year. If at least $20 were expended the first year and at least $10 each subsequent year, the school would in a short time have a library fully sufficient for the needs of the pupils.

It is interesting to notice how the library movement has taken in other countries. In an article in the "Review of Reviews," by Clarence H. Poe, the success of rural school libraries in North Carolina is thus described:

"Just now, when the princely donations of Mr. Andrew Carnegie have

given a new stimulus to library-building in American cities, it may be well to turn our eyes to the 'other half,'—the rural half,—of our population, for although, until quite recently, no one thought of the public library as a possible rural institution, it has now made an auspicious entry into this new field, and is destined to play an important part among the twentieth-century forces, rural mail delivery, good roads, rural telephones, etc.,—that make for the uplift of American country life.

"The need of the rural library must be apparent to all who are familiar with country school methods. Reading is the magic key to all our storehouses of intellectual wealth; it is the basis of all education. 'The true university of these days,' say Carlyle, 'is a collection of books.' And it is here, of all points in its curriculum, that the country school has failed most grievously,—it had not taught the child to read, to use books. Do not understand me to charge that the rural school is literally and avowedly disloyal to the first of the immortal three R's, for it is not. But only in the narrowest sense does it teach reading,—reading as the mere pronunciation of words and the observance of punctuation marks; the unlovely mechanical side of reading. The brighter side of reading the country pupil does not get, the city pupil does. Aided by the prescribed supplemental literature, and guided by the teacher, the child of the townsman learns to find joy in reading, learns not only how to read, but actually learns to read, to use books. If you know the country school as the writer does, you know the other side of the picture. You know children who live out a long school career without learning anything of literature beyond the monotonous rehearsal of dry text-book matter. Cold, hard facts about the boundaries of foreign States, the dates of ancient battles, the rules of the Stock Exchange, are regarded as matters of importance, but the teacher does not see that it is better to foster a love of reading than to teach history or geography. Or if he sees the duty, and longs to direct the child to the beauties of literature, he is shackled by the lack of facilities for such work. Year after year, there is the same old drill in the same old readers, no classics are studied, and there is no supplemental reading to give the spice of variety.

"It is inevitable that children reared in such schools come to regard reading not as a luxury, but as drudgery, and grow up potentially, if not in the strictest sense, illiterate. 'I confess,' says Thoreau, somewhere in his 'Walden,' 'that I do not make any broad distinction between the illiterateness of my townsmen who cannot read at all and the illiterateness of him who has learned only to read what is for children and feeble intellects.' How much narrower, then, should be the distinction between the 'illiterateness of him who cannot read at all' and the illiterateness of him whose training has been such that he regards reading only as a task to be shunned! People everywhere are now beginning to see the mistake pointed out, ten years ago, by President Eliot in his essay 'Wherein Popular Education Has Failed.' He said:

" 'We have heretofore put too much confidence in the mere acquisition of the arts of reading and writing. After these arts are acquired, there is much to be done to make them effective for the development of the child's intelligence. If his reasoning power is to be developed through reading, he must be guided to the right sort of reading. The school must teach not only how to read, but what to read, and it must develop a taste for wholesome reading.'

"It is to remedy just this defect that the rural school library has been introduced into twenty-nine American States. And though widely varying plans have been adopted in no other State, I dare say has more rapid progress been made or greater results accomplished in proportion to capital ex-

pended than in North Carolina. For this reason I may be pardoned for referring at some length to this North Carolina plan, which seems to be the one best adapted to States having a large rural population and a small revenue. The law as passed by the General Assembly of 1901 provides, in substance,—

"That wherever the friends or patrons of any rural public school contribute $10 or more for starting a library in connection with the school, $10 of the district school fund shall also be set apart for the same purpose, while another $10 will be given from the State appropriation,—thus insuring at the outset at least $30 for each school library; in many cases, of course, the patrons contribute more than the minimum sum, $10, needed to secure the $20 from other sources. The county board of education then names some competent person to manage the prospective library and buy the books for it, these to be chosen from a remarkably well selected list of standard works recently prepared by a committe of distinguished educators. The same committee, by the way, obtained competitive bids from prominent publishing houses, thus forcing prices to strikingly low figures, even for classics. The smallest libraries have seventy-five or eighty neat and substantially bound volumes.

"One other fact deserves mention. Not only does the rural school library develop the reading habit,—it develops it along right lines. Since, as Emerson says, "the ancestor of every action is a thought,' how important it is that the literature that is to provoke thought be wholesome and well balanced! In our city libraries, fiction has much too large a place, many women and young people read nothing else. But while these rural libraries contain a few great novels, the chief effort is to develop a proper appreciation of choice works of science, travel, nature-study, poetry, history, biography, and mythology. Even if the child formed the 'reading habit' outside the school, it would still be worth while for the State to have these libraries for the sole purpose of turning his new-found love of literature into right channels of truth and beauty.

"Nor have the boys and girls been the only beneficiaries of the new movement. It has opened up a new world for many of the parents, and has done incalculable good in continuing the education of persons too old or too poor to longer attend school. The Superintendent of Schools for Durham County says that the books are used almost as much by the parents as by the children themselves, and the Pitt County Superintendent says that the libraries have caused hitherto indifferent parents to become deeply interested in reading and in the education of their children. 'The peculiar value of the school library,' as the New York Evening Post rightly observes, 'lies in the fact that it educates the younger generation as well as the older.'

"All in all, the North Carolina plan has proved a strikingly successful innovation, and we are moved to wonder that our educational leaders did not long ago perceive the value of rural library work, or realizing it, did not think of the ease with which it may be conducted in connection with the public school. We are now not far from the time when no house where children meet for study, whether in town or country, will be regarded as even tolerably equipped with a small collection of the best books."

Joseph S. Stewart, in the Alkahest, says:

"Arizona gives fifty dollars every year for books for school libraries to every district having one hundred children. California has a district law and makes annual contributions to the libraries. Colorado gives one-tenth of a mill school tax to its rural libraries. Illinois allows an amount not to exceed two mills. Indiana one-fourth to one-third of a mill. Iowa one mill. Kentucky two years ago enacted a law allowing the commissioners to use a

part of the school fund for libraries, one to be at the commissioner's office, and then as much as ten dollars for each school district if the people would raise ten dollars. As a result, in two years, every county has a local library in the court house, and there is a library for every seven hundred and twenty children in Kentucky and one book for every ten children. Maryland allows the Superintendents to give ten dollars, if the community will raise ten dollars. Massachusetts fifteen dollars if the district will raise fifteen dollars. New Jersey appropriates twenty dollars the first year, and ten dollars each year thereafter. Michigan has it in the constitution that the legislature shall provide for at least one library in every township. Minnesota has a similar law. Missouri passed in 1900 a law allowing the commissioners to withhold five cents for every child enrolled in school, and appropriate that money for a school library if the community would raise an equal amount. Under that law, last year, the commissioner writes me, they spent sixteen thousand dollars for libraries. And he says that there was never money spent that brought a richer return. Kansas, Nebraska, New Hampshire, the Dakotas, Oregon, Pennsylvania and Vermont have district laws. Wisconsin sets aside for district libraries ten cents for every child enrolled. North Carolina passed a law the year before last appropriating five thousand dollars from the State funds to be paid out, ten dollars to every school district that would appropriate ten dollars, and whose citizens would contribute ten dollars. Mr. Joyner, the State Superintendent, told me a few weeks ago that the five thousand dollars was taken up in three months; that they bought in North Carolina last year two thousand four hundred books for their school libraries, and he said, 'We propose to keep that up—five thousand dollars a year—until every school and every boy and girl has access to the best literature of the world.'"

Another American writer speaks of the value of the library as an educator:—

"As the library is about to enter this new home and thus to assume a position of increased usefulness and importance, it is well for us to look upon it in the true light. The library is in reality an educational institution supported by the city. The school and the library are the two co-ordinate branches of the educational system of the city. They are the two points about which community life should naturally centre. They are mutually interdependent. The success of the library depends upon the character of the readers which we send from the public schools. It is said that the average American child has but five years of schooling. In the majority of cases, the child upon leaving school must continue his education in the library, if he continues it at all. He will not continue it, unless a desire for knowledge and a taste for reading have been previously formed in the school; people must be prepared for the library. Moreover, the connection with the library must be made before the child leaves school. No one outside the home ever enters so intimately into the mind and heart and life of the child as does the teacher. It is the duty of the teacher to train for the library. On the other hand, just as the teacher knows the child, so the librarian knows the books. It is a pleasure to record that our own librarian is ever ready to place all the resources of the library at the disposal of the teachers and of the children."

"A director was heard to object to 'wasting money on school libraries,' saying that his district had had a good library once and it had been used up and lost. On inquiry it was found that his 'district library' a few years ago consisted of a few story books and patent office reports. Of course they were 'used up,' possibly for kindling, as they were not fit for much else. Should a school board purchase the thirty-three volumes recommended to supplement

the State course of study they may be 'used up' in a few years by the children in school work, and they should be used they are made for that purpose. It is not generally true that teachers will not take care of them and use them properly.

"Among the live topics for teachers to discuss when they get together is the 'school library'; how to get it; how to use it, and how to take care of it. A half day should be set apart for a general discussion of this at the fall meeting and at a time when directors and patrons may be present to take part in the discussion. A good working school library is of more value than all the charts, maps, and globes that can be brought. Missouri school boards should stop spending $100,000 each year for worthless material and put that much and more into good literature, history, geography, and nature study books for use in the schools." -W. T. Carrington, State Superintendent, Missouri.

IX.—MODERN EDUCATIONAL NEEDS.

In my previous reports, I took occasion to draw attention to the changes in courses of study and methods of teaching which are forced upon us by modern industrial and social problems. It is to be feared that many persons fail to recognize the need of educational progress, in view of the alterations which have arisen within a half century in the industrial and social relations of the people. In past generations, the influence of the home almost overshadowed the institution of the school. Doubtless that condition had its advantages, and it is to be regretted that in some particulars the duty of the parent is too often relegated to the teacher. At one time the home produced and prepared nearly all the food consumed by its members. It was the scene of diversified industry, as well as the scene of the child's social life. The school was then merely regarded as the place where the three R's were taken up by the youth.

The growth of the factory has caused the home to lose some of its many industrial functions. The changed conditions have increased the importance of the school, and diversified its functions. The factory system has gradually expanded and now utilizes the economics of what has resulted from a division of labor and the centralization of industry. At one time, whatever sewing, knitting, weaving, baking, washing, and cooking were required for the family were done in the home. Now much of this labor is performed in the factory. Girls, as well as boys, have, as a result, much more leisure, and it is not to be wondered at that employment in the factory has become so general. The farmer was once a small manufacturer, as well as a worker of the soil; now the two kinds of work are separated. The factory system is partly responsible also for the movement of the population from the country to towns and cities. These changes have restricted the scope of all the occupations, and have given the child much less chance to see or engage in industrial operations. In many homes the familiar chores of a former generation are not to be found. City homes are no longer able to furnish opportunity for manual training, and, therefore in this respect, the country boy has advantages not possessed by city youth. The growth of democratic institutions has also been a marked feature of the last half century. The management of the affairs of the school section, the township or city, the Province and Dominion call for intelligent citizens.

'The great changes in industrial and social life and the growth of democratic institutions render necessary changes in school courses and in educational methods. Doubtless society needs time to adjust itself to the altered conditions of life, and, likewise, time is required to remodel and re-construct

our educational system upon an improved basis. There is ordinarily a great divorce between the school and society. The object of the pupil seems to be to acquire mere knowledge and attend to his books until school days are over. It would be well if each pupil recognized the advantage of having education go on all through life. Laboratory methods, which have revolutionized the work of the University, have only to a limited extent affected the High School, and the Public School far less. The life of the average working man must be broadened, and the professional man should not be the ideal placed before students. The great mass of the students cannot, from the very nature of the case, occupy prominent positions. The ordinary pursuits in life will be followed by the great body of those who attend our schools. Hence whatever subjects are essential to the masses should receive most attention. The division of labor which has resulted from modern conditions is apt to make each one acquire a limited amount of knowledge. The mechanic is often bound down to a rigid and monotonous routine. He becomes part of a machine. If a broad curriculum is prescribed for our schools, this danger may be lessened.

"The school must show the social necessity of each person's task, and give a clue to the great industrial labyrinth. The problem of the relation of labor to capital cannot be solved until the work and function of all the factors of production are clearly understood by a majority of the people; when such a condition obtains, the question of the proper distribution of wealth will be greatly simplified. The school attempts to meet the new conditions by enlarging its curriculum; it now aims at more than mere mental training and discipline. Manual training, nature study, kindergartens, athletics, physical training, domestic science, cooking, sewing, drawing, modelling, painting, music, are now incorporated into the course of study. These added features are merely tentative attempts to give training which was formerly provided outside the school, but which cannot be provided under present conditions. Much of this has been added haphazard, in order to fill a vaguely defined need, without proper arrangement or agreement with the older portions of the school curriculum.

"What does this signify? Does it mean that the home and the home training is less important than in former years? It is clearly shown that the importance of the school has increased, and that it is to continue to do so. Home training is highly individualistic; school training is not. A broader view of education is now taken. The State educates the young in order to advance the welfare of society. Its aim is to make the good citizen and the efficient producer and consumer. The result desired is the elevation of the standard of living of society—a social benefit. The mass can, however, be elevated only by acting upon each individual composing it. The school, with its wider view, is to be a mighty force, which is to make for equality of social and industrial life. The school becomes society's agency for the promotion of its collective welfare. Its purpose is chiefly directive. Society is recruited from the young, and it is necessary that the new incoming generations be worthy successors of the outgoing. The attention must be fixed upon those institutions which train the growing child, and not so much upon those corrective and repressive institutions which are needed because the early training and direction of their inmates was not what it should have been. We spend too much money on the diseased tree, but not enough on the growing twig. The functions of the school must relate to the intellectual, physical and moral training of the young; the greater the efficiency and effectiveness of the school, the less the need for corrective and repressive institutions."—Education.

"The primary graded schools and the high schools of our cities and our State universities have been articulated and unified into a national system. In the newer States, which were settled after high schools and State universities became popular, this system occupies nearly the whole educational field. In the studies offered, in the location of the schools, and in the methods of providing revenues this system suits the American people. The recent rapid development of city high schools, and especially the recent large financing of State universities by many States, and the falling off in number of new private and religious academies and small colleges, indicate that the State is more and more to be in charge of our educational institutions.

"A century ago, the whole framework of the education from primary to college classes looked to a finished education. The need then seemed to be an educated class. Now, our educated class has grown large, and has followed the law of the division of labor; it is divided into sub-classes of specialists, each demanding and securing special education. A new system is a necessity. The introduction of machinery and cheapened transportation have carried the division of labor to all classes of people. Special as well as general education is now demanded by the people, because they have discovered the advantages peculiar to each.

"The old system of schools said, 'Educate the man first and the specialist afterward.' This practically means that special education be confined to higher education. It too nearly means aristocracy of special education, and too nearly ignores the 99 per cent. who cannot take a college course before pursuing a course in a specialty. The old-time apprentice system, instead of keeping pace with the greater needs for special training among the industrial classes, has retrograded. And the result is that our system of education needs readjustment at the bottom and middle, so as to better serve those who drop out during the primary and high school courses, or upon graduation from the high school, and enter at once upon work which usually proves to be a specialty more or less definite in its nature.

"In the old system, where the texts, the teachers, and the ideals were all centered in some city profession, and the road to fame was laid out through the complete course of a collegiate education, the boy or girl who was to be a farmer had no special place. The assumption was that what was good preparation for entrance into the freshman class in college was equally good for the boy who was to be a farmer, or the girl who was to manage a farm home. The result has been that, next to the more rapid increase in the demand for city workers as compared with the country demand, our schools have been the most potent influence in leading our people from the farm to the city. Our scheme of education has taught of city things rather than of country things, and by ignoring the farm and the farm home our greatest industry, farming, and our best institution, the farm home, have been discredited.

"Forty years have been necessary for the experimenting with and the development of collegiate courses in agriculture in our State universities and State colleges. During the past fifteen years, experiences have been successfully carried out in establishing large agricultural high schools, and in a third as many years of trial consolidated rural schools, with free transportation, have been successfully inaugurated in numerous localities. Once our educators generally realize the practicability and the far-reaching importance of these three classes of schools, they will, doubtless, lead the people to adopt them and to arrange them into an articulated system. As city primary graded schools, city high schools, and university and college courses have been articulated into a unified system, so the consolidated rural school, the agricultural high school, and the college of agriculture can be articulated

into a parallel system. The one, with its industrial side strengthened, will serve the city life; the other will serve the country life, and without very serious loss of time, the student who so desires can transfer from one system to the other. The whole system of American education thus unified will become as useful to country people as to city people."—Professor Hays, of Minnesota University.

"Negatively, education is not the mere acquisition of knowledge. To know how to read and to write, to translate foreign languages and to solve difficult mathematical problems, does little more than afford the means whereby an education may be obtained. Upon the supposition that these acquirements constitute an education of the masses, countless tables of statistics showing the alleged relation of crime to education have there found their basis. I deem it unnecessary to distinguish between so-called true education and false education; the real principle involved here is that education does not consist in merely acquiring, but is largely a process of development, brought about by the exercise of the function of knowledge. The question considered affirmatively has many answers, all of them, however, related to each other. According to the poet, the painter, the enthusiast, it is the process whereby physical and moral powers are made to serve the spiritual nature in its highest purpose—'the soul's awakening.' According to the humanitarian who holds the true moving powers of life to be the will of that Providence that rules and guides the world, and that is expressed in love, charity and a feeling of a community of interest, education is the process whereby there is created and strengthened love and brotherly feeling towards all humanity. The sociologist defines education to be the act of finding oneself, or, in other words, the means whereby one finds himself in proper place in society, and sufficiently equipped to discharge the duties to himself and to society that belong to his real station. The industrial holds that it is the preparation for the conquest of environment to the well-being of the human family, while others, having in mind probably the individual only, assert that it is the preparation for taking care of oneself.

"A definition, that seems to combine all that is excellent in each of the above and that suits the practical teacher very well, is that education is the symmetrical and complete development of the faculties and powers of a human being, morally, mentally and physically. In the first half of the last century a distinguished educator wrote: 'The lowest claim which any intelligent man now prefers in its (education's) behalf is that its domain extends over the threefold nature of man—over his body, training it by the systematic and intelligent observance of those benign laws which secure health, impart strength and prolong life; over his intellect, invigorating the mind, replenishing it with knowledge, and cultivating all those tastes which are allied to virtue; and over his moral and religious susceptibilities also, dethroning selfishness, enthroning conscience, leading the affections outward in good will towards man, and upward in gratitude and reverence to God.' "—Minnesota Report.

X.—SCHOOL GARDENS.

The plan of having a school garden attached to a school, though new to this Province, has been followed many years in some other countries. The school garden movement, as it is understood to-day, is a modern thought. The development of the idea has been very rapid in Europe. France alone has more than 28,000 and in Russia no school will be accepted by the State as entitled to public funds unless a garden is connected with it. In the United States the school garden movement has made rapid progress within the last twenty years.

In a country like Canada, where so large a portion of our exports are products of the farm, it is evident that our children should know much about farm operations; indeed, it is worth noticing that the largest proportion of our successful business men were brought up in the country districts, and, thereby, gained a knowledge of the productive industry of the farm. It is not too much to say that no other kind of training is so valuable for all-round development as agriculture. Farmers' sons are brought up to use their hands, as well as their heads, and acquire the habits of observation, which are valuable through life. A school garden in country districts serves to bring school life nearer to social life. It presents improved opportunities for nature study, and serves to give to children brighter impressions of the work of the farmer.

It would be easy to provide a school garden for nearly every school in the country. A small piece of ground could be purchased adjacent to the school, or not far from it. Under the teacher's instruction the pupils could be trained to grow vegetables and flowers. The aesthetic side of education should not be lost sight of, and the aesthetic and agricultural elements might be made to harmonize. For the younger pupils it would probably be well to have a general bed or garden. For the older ones arrangements could be made so that each pupil will have a small plot of ground. By having individual garden plots, the children will be inspired to do much more careful work, and the advantages of emulation may be brought into play. By growing both vegetables and flowers, the aesthetic and the practical side of the pupil will receive attention. Children in this way may be trained in the use of tools and encouraged to take care of them. The advantages of fertilizing the land and the different kinds of manures may receive attention. In some places where the school gardens are large a considerable sum is often realized from the products when sold. The funds secured in this way may be used to purchase requirements for the school. It is quite clear that a wide field is open for improving our schools by the establishment of school gardens. In a few parts of the Province the movement has already received attention. It is to be hoped that the idea will grow under the fostering care of our Public School Inspectors. The Regulations respecting School Gardens will be found on page 82 of this Report.

"A year ago there was printed, as an appendix to this report, an article upon school gardens, both in this country and in Europe. The subject is of interest from both the utilitarian and the aesthetic points of view. In these days, when attention is being directed so persistently to the manual side of education, and when also much is made of the culture of the beautiful, there is no one thing which combines the two so well as the school garden. Here is a channed open, without cost or special effort, to the rural school. If availed of the idea is capable of transforming many of the most forbidding unattractive school grounds into pictures of beauty. Nor is this opportunity restricted to the rural school. In many of our villages, and in all of our cities, it is possible to render the school premises more attractive to the children who frequent them as well as pleasing to the general public. The usual notion of a schoolhouse site is covered by a place for the building and a space for a playground for the scholars. The devotion of any portion of the space to such an idea as a garden would generally be considered a piece of unwarrantable extravagance. But when we turn to the little homestead which the prudent and thrifty citizen has created for himself we almost invariably find quite a piece thereof given up to flowers and shrubs. If the individual citizen deems it worth while to minister in this way to the demands of his home life, why should it be called extravagant for the public to follow the same course? Certainly what is good for the education of the child at home cannot be far out of the way when he goes to school.

"If teachers would prepare themselves for this line of endeavor it would furnish a field for the training and discipline of their children not to be excelled by any opportunity given within the walls of the school room. Co-operation, oftentimes the key-note to the most successful efforts, would here find its best place, and the true spirit of helpfulness would be generated on all sides. The great objection to the introduction of any enterprise of this character into the school life is that it takes too much time. It all depends upon the manner of such introduction. It has been demonstrated by skillful teachers that subjects can be taken into a curriculum already apparently loaded, without adding materially to the burdens. On the other hand, it is a very easy thing to make a heavy load of the simplest matter. 'Where there is a will there is a way,' and to any teacher imbued with a thorough love of nature and a desire to kindle the same spirit in her scholars, the school garden would be but an easy path for both herself and her children." —Rhode Island Annual Report.

"Nobody need be told that children, everywhere, love flowers. This is as true of the little waifs who live in congested quarters, as of the child of luxury. To awaken interest in school gardens and beautifying the school grounds is a very easy matter. A writer in a recent number of the Christian Endeavor World says that the children of one school in Minneapolis begged of their parents all the old rubbers lying around the house, and these were carted to the junk shop by the boys, who obtained fifty dollars for the prize. Every cent of this was spent in beautifying the school grounds, the boys digging the holes for fence-posts and the girls laying out and planting flower-beds. The result was a revolutionized schoolyard, and each child took pride in the work.

"Street car companies in Minneapolis have furnished transportation that the children may visit the neighboring experimental farm, and next year the children plan to furnish the hospital with flowers gathered from their school-yards.

"The pioneer in this civic-improvement work, Stockbridge, continues the same writer, long ago saw the necessity of interesting children, and in another town where the boys and girls were trying to maintain beautiful surroundings a disinterested man offered four dollars to any boy or girl who could cultivate the best flower-bed. Several towns in Missouri, among them Carthage and Bethany, offer prizes and urge children to exhibit at their county fairs. In some instances boys who are employed as newsboys carry water long distances after school hours, that the little patch outside their forlorn homes may be cultivated. Still another phase of the work is seen in Honesdale, Penn., were the children pick up papers on the street, and deposit them in tin cans provided for the purpose.

"The first school garden was started in the spring of 1891, when a wild flower garden was made on the grounds of the George Putnam School, Roxbury, Mass. About two hundred specimens were introduced in five years, among them goldenrod, asters, ferns, and other plants common to field and forest. In the same year the Massachusetts Horticultural Society offered a prize for the best-kept school yards, which has been won every year by the George Putnam School."—New York School Journal.

"Superintendent Stableton in Bloomington, McLean County, has converted the saharas that have surrounded the school buildings for years into flower gardens. He has gone further. Seeds and bulbs have been distributed among 4,000 children and more than one thousand homes are made more beautiful thereby. An exhibit of what the children have grown at home is made at the different school buildings every fall. It is the school's fair where each producer displays his products. Each year's product is some

specialty different from the year before. This year it is asters; last year it was different. Not only do the children learn how to grow plants, but they learn how to care for them during the winter, how to treat bulbs and cuttings, how to bud and graft, and how to lay out a flower garden and plant it so as to produce the best effect. They learn, too, the season of maturity of each flower, and constant observation gives knowledge of its habits. They are coming up through the grades with a varied experience in regard to plants that will be useful and a source of pleasure in after years. There is not much theory connected with the instruction. It is practice in following directions sent out on printed slips in spring and fall. The theory is the net result of the experience.

"W. P. Johnson, of Carroll, Iowa, is directing the growth of gardens of a different kind but in a similar way. The boys plant patches of vegetables,—radishes, or cabbages, or squashes, or sweet corn, or celery,—and the like. They cultivate them during the season and harvest them. Here would be an opportunity for a vegetable fair in the fall. The parents might encourage the children by purchasing the crop at its market value.

"To make this instruction and experience profitable, the parents must second the efforts of the teacher.

"These examples indicate the lines upon which the teaching of agriculture, or the study of nature, must proceed under present conditions. The opportunities are ample in every rural district, or village, or small city, for training of this kind."—School and Home Education.

"The educational advantages of the school garden are many. Besides affording material and opportunity for nature study it gives a practical direction to agriculture. We can easily imagine that young people interested in the school garden will take a greater interest in the home garden. The wise father and mother will encourage this interest as their children grow up, by giving them a piece of land to cultivate for themselves and allowing them to use the profits arising from it. The experiment might practically decide whether a boy or girl had an inclination for farming; if so that inclination should be encouraged, and many farmers' sons and daughters thus be led to choose a healthy, independent life in the country instead of crowding narrow, unwholesome quarters in cities, or breathing the stifled air of close rooms and factories.

"The cultivation of a taste for flowers, shrubbery and trees is not an unimportant part of the education of boys and girls. The child that goes from a home where some attempt is made at adorning the grounds with trees, shrubbery and flowers, cannot find congenial surroundings in the bare rooms and still barer exteriors of most of the country school houses.

"Again, if there is a neat and well-kept school room, a well-kept garden or lawn in front of the school house, the child from a home not provided with these simple evidences of taste and comfort will soon carry out a successful agitation to have the home surroundings improved.

"Prof. H. W. Smith, of Truro, in the course of an admirable address at Baddeck, showed that school gardens may be kept up anywhere on a simple and inexpensive scale. It is not necessary to buy the land nor to have large gardens. An eighth or a tenth of an acre is quite sufficient. Usually this may be had from a resident adjoining the school grounds, and he will care for the garden during the summer vacation, and receive his pay in 'shares' of the products. He had known of mutually satisfactory arrangements that had been made on this basis. The object should not be to grow vegetables of large size, but to see how great a variety of useful plants could be produced, and to calculate the yield per acre of each kind. This would be an object lesson to farmers, who would not be slow to avail themselves of the

results. The expense of such a garden, for seeds and implements would not be more than three or four dollars a year.

"A grass plot in the middle and a background to the garden of small shrubbery, fronted with a bank of ferns, violets, and other wild flowers, would add to its usefuliness and attractiveness. This in season. In the school room there may be kept a garden all the year round—pitcher-plants, violets (which will bloom in winter), ferns, dwarf evergreen trees (which are very ornamental), the red berries of the Canadian Holly (Ilex.), etc.,—all these may be kept in shallow plates surrounded with moss.

"Can teachers resist the temptation to have gardens like these?"—New Brunswick Educational Review.

The following valuable suggestions are from a writer in the "Popular Educator."

"There is nothing that will so gladden the hearts of children as the little things that grow out of the soil and descend from the skies and gather from far-off places and times.

"Children would do things if they were shown how, if a little time were taken to instruct them just how to fix the boxes or jars, to put in the plants and care for them. Much time is spent in the unproductive so-called nature study, but if we could only manage to develop the love of a flower in the heart of a child, no amount of knowledge could compare with the value of it.

"Schools begin in September and what is done must of course be for the inside instead of outside. Almost every child has a little plot of nasturtiums and he will bring two or three of the plants, roots and all. The request to a room full of children will bring more nasturtiums than can be used.

"There is no lack of grape baskets, and if there are no large boys in the room, ask someone in the higher grades to fill the basket with good rich earth. To the handle of a basket tie a string and attach to a nail above the largest, sunniest window in the school room. In fact, there may be a series of baskets, one above the other, veritable hanging gardens, at least three in a window

"Into these baskets have been put the nasturtiums, which have been well watered; they do not seem to know that they have been brought in from out of doors.

"I have done this for several falls and they soon become a mass of bloom, through all the intermediate shades of deep yellow into orange and from orange into maroon, deepening and lighting everywhere, in most perfect gradation and richest contrast of color. The whole scheme of yellows and browns and reds is more perfect than painter of pictures could devise.

"There were successive waves of color, as week succeeded week: they flooded the children with delight, and overflowed the somber days with a beauty, not dependent upon sunlight or even upon sunny moods of mind.

"The children were encouraged to try the same thing at home, and out of thirty children, twenty-three of them had baskets of blooms at Christmas time, in their own homes. The nasturtium is a stalwart, sturdy plant, and does not have to be pampered and humored as do many house plants .

"The plants, besides, furnished dainty wee bouquets for a sick child, all the more valued because they came from his companions, and they gave up their beauty to render the drawing lesson more attractive.

"The children learned the care of the plant, its needs and habits: it was the first object of attention in the morning, and the constant comradeship of its presence was invaluable."

Regarding the surroundings of rural schools, State Supt. Charles R. Skinner, of New York, writes as follows:—

"Millions of school children, throughout this country, are seeking education under the most wretched conditions, in miserable buildings, poorly equipped, with no playgrounds but the fenceless yard, the highway or the hillside, where the thrifty farmers' cattle wander at will. If we expect our children to live the beautiful and love the beautiful, we must surround them with beautiful influences in home and school. A child is educated by every influence with which he comes in contact; is being changed for better or for worse every moment of his life. I pity the man who has no pleasant recollections of his school days; and how can he have such happy memories if his school life is associated in his mind with a tumble-down building, a barren school room, and constant contention to preserve the school playgrounds from the encroachments of animals and tramps?

"It is in the power of teachers and friends of education to change these conditions—will they do it? A movement is already under way and this association of educators should encourage and co-operate in this reform. Parents and patrons should be stimulated to properly fence and improve the school grounds, and the children should be encouraged to feel that these grounds belong to them, that they may have an opportunity to make them what they should be. If this is done we shall find that we have taken an important step toward giving the principles, taught inside the school house, an opportunity for expression in the life of the child.

"When we talk of enriching courses of study, let us not forget how much of life's course of study is furnished by environment, and that its enrichment makes possible nobler tests and more refined ideals. Ruskin has said: 'What we like determines what we are, and is a sign of what we are; and to teach taste is inevitably to form character.'

"School grounds may be made beautiful without restricting free play, and the work may be so done as to bring rich returns to hand, head, and heart. School authorities, farmers, fathers, and particularly mothers, should be interested in this cause. The school grounds should be well fenced and suitably graded. In the decoration there should be a definite and well-considered plan. 'School-ground committees' of girls and boys should be selected to care for the yards during the hot, dry vacation months in order that the work of the springtime and early summer may not be wasted.

"The public school aims at a development of all the faculties, with the ultimate purpose of leading to better citizenship and nobler character. It must not, therefore, neglect any opportunity for broadening the experience upon which to build the essentials for a complete life. It is in helping nature that the child feels the influence which makes for his greatest good. If we can educate a child to love a flower or care for a tree, we have helped to lay the foundation of character."

XI.—NATURE STUDY.

The importance of Nature Study has now been fairly well accepted by the teaching profession. Nature Study should start by making pupils interested in the commonest things in their environment. It is safe to say that too often the instruction given to young children pertains to matters far away from their surroundings. Were it not for traditions, a teacher would naturally instruct children in the plants and animals of the fields and forests. To teach in the elementary schools what is simply taken up in college or university is not sound in principle. The old academic methods are out of place with young children. Professor Payne says "The greatest achievement of modern education is the gradation and correlation of schools, whereby the ladder of learning is let down from the University to secondary schools and from these to the schools of the people."

It is difficult to have many persons believe that education can be given apart from books. If we start a child with a book, we take him away from the world in which he lives. One purpose of Nature Study is to make the child acquainted with the conditions that meet him on every side. The child should not feel that on going to school he is entering a different world from the one he experienced at home. In this connection it will not be out of place to quote a portion of an article on Nature Study by Professor L. H. Bailey of Cornell University.

"It is not strange when considered historically that this is so, for education was at first aristocratic, and common-day problems were not within its purpose. Education was an accessory, or a supplement, or a culture. As education has become democratic, the old methods have still been employed, so that the type of instruction in the schools of to-day is largely a reflection of the old academic practices and ideals. The opposing point of view is gradually establishing itself in the introduction of the kindergarten, manual training, science teaching, and other innovations. It is strange how long it has taken for the ideals of Pestalozzi, Froebel, and the other great reformers to enter into our school-practices. Even yet, the old Greek ideals that are supposed to lead to 'culture' and to 'learning' seem to dominate our work. Science teaching has done much to relieve us from the incubus of the old, but it has also imposed an incubus of its own. Its great fault has been that it has so strongly insisted on the importance of the subject matter, and has been so absorbed with the investigational phase that it has sometimes forgotten the child. It has tended to annihilate sympathy with nature in its passion for the discovery of fact; yet it is true that most persons need sympathy with nature more than knowledge of nature, if their education is to enable them better to live. Of course, the acquirement of knowledge and the growth of sympathy should go together, but it is a fact that they do not always thus go together. I fear that the dry-as-dust science teaching has driven many a youth from nature.

"Fundamentally, nature study is seeing what one looks at and drawing proper conclusions from what one sees, and thereby the learner comes into personal relation and sympathy with the object. It is not the teaching of science—not the systematic pursuit of a logical body of principles. Its object is to broaden the child's horizon, not, primarily, to teach him how to widen the boundaries of human knowledge. It is not the teaching of botany or entomology or geology, but of plants, insects, and fields. But many persons who are teaching under the name of nature study are merely teaching and interpreting elementary science.

"Again nature study is studying things and the reason of things. It is not reading from nature books. A child was asked if she had ever seen the great dipper. 'Oh, yes,' she replied; 'I saw it in my geography.' This is better than not to have seen it at all; but the proper place to have seen it is in the heavens. Nature readers may be of the greatest use if they are made to be primary agents. The child should first see the thing. It should then reason about the thing. Having a concrete impression, it may then go to the book to widen its knowledge and sympathies.

"Nature study is not merely teaching this or that. It is not merely the adding of more 'work' or of another 'exercise' or 'period' to the school. To lead the child to see and to know the things with which he comes daily into contact is nature study. It will at once be seen, therefore, that nature study is an attitude and a point of view, not a method or a system. The methods will be as various as the teachers. Here and there it will be overexploited and overmethodized; now and then the name will be dropped, and persons will say that the subject is dead or is passing away; but the essence of it can never pass away because it is fundamental to the best living.

"Nature study would not depreciate the value of the old line school subjects, least of all of literature and history and the other 'humanities,' but it would give these subjects their proper place in the school life. The child should first be interested and taught in terms of the common objects and phenomena; then it may be led out and on to every country and to every human interest. We should begin here, not yonder. Education should be essentially native and indigenous, not exotic. It should be expressed so fully in present day terms that it becomes an integral part of us, central to our lives, not an acquirement. Do not some institutions still turn out students with mediaeval types of thought?"

Nature study is receiving much attention in England. The following articles are from the last English report:—

"Perhaps the most noticeable feature in the courses of instruction during the last two years has been the increased attention given in most schools to Nature Study. The process of making acquaintance with external Nature is being made delightful and stimulating to the children, and while their capacity for exact observation is being developed they are being taught to take a pleasurable interest in every living thing around them. That interest in the green earth, and in its feathered and four-footed tenantry, which is seemingly instinctive in most children, is being fostered into a lifelong resource. It is pleasing to notice how many school plants are now grown for observation, and how the growth of the plants is observed and recorded from day to day, so that the children gain something of the pleasures of original investigation, simple though it be as yet. By collections of flowers—each child bringing his own specimen—carefully pressed, in large exercise books, the children's interests in the marvels and the beauty of the familiar wild flowers in their locality are being stimulated. In this respect it is interesting to notice that girls' schools excel. Nature diaries are kept by many scholars, and on the walls of many a rural school will be found recorded (this I have noticed now for many years at Pentrecelyn, near Ruthin) the most striking natural events observed by the scholars, the date, the name of the place, and the name of the scholar being mentioned. Many teachers possess a special knowledge of school gardening and a real interest in the subject, and one cannot too greatly admire the readiness with which many of them, often out of school hours, take their scholars to the school-house garden, there to tell them what he has learned and observed in his leisure hours."

"This is a new subject and differing from other subjects in its aims and objects and mode of treatment. Whereas other subjects appeal quite as much to the memory as to the intelligence of the pupils and are intended to add to their store of general information, nature study has for its main object the awakening and the cultivating of the child's powers of observation. In the ordinary curriculum of school work, the teacher leads the way, personally conducts his pupils to all new truths, permits no departure from his own itinerary, and insists on the passive reception of, and unquestioning belief in, all his dogmas. In nature study, on the other hand, the pupils wander at their own sweet wills, follow their own bent, make discoveries on their own account, and only when bewildered and puzzled by the phenomena around them, replace themselves under the direct guidance and instruction of the teacher. Their difficulties removed, they again set forth to continue their personal converse with nature. Such, I conceive, should be the relative attitude of teacher and taught with respect to this subject, both in and out of school. But what do we find in too many schools? No discrimination in the methods employed, the subject made to stand in line with other subjects treated identically the same, and fed and nourished by copious read-

ings from nature study readers. Lessons on subjects are often selected which canot be locally illustrated, and are often chosen from text books which cannot possibly embrace every school environment within its covers. There hardly exists a rural school which is not surrounded by a rich variety of phenomena, growths, and animated life upon which children can bring their powers of observation to bear with radiant pleasure and delightful profit. These should be sought and studied, and not the stereotyped and hide-bound homilies, however eminent their authors and excellent their contents."

"Nature study, it must be remembered, has many functions to fulfil. In primary and secondary schools its mission is educational, to train the mind, the eye and the hand, and to serve as an introduction to science as such. In continuation and agricultural schools the aim is technical and utilitarian. It is well to maintain these distinctions, lest it should be imagined that some highly specialized form of instruction were advocated for the former schools, where it would be altogether mischievous and out of place. The lessons should be directed as much as possible towards living objects, to trace the life histories of plant, animal, or insect. As it has been feared that the scholars may be led to do irreparable harm by the wanton destruction of rare plants or birds for their school museums, it cannot be too strongly insisted upon that collecting for the sake of collecting is worthless, and one of the results to be looked for from nature study is a greater reverence for all living things. The proper way in which to study a plant or an insect is in its living state. This may easily be done by cultivating a few plants in boxes or pots, or by watching the development of insects in breeding cages. Simple experiments may also be performed, the apparatus for which can be inexpensively constructed out of the most ordinary material without any special skill in handicraft. The instruction may be given partly in school, partly through walks, and partly by the cultivation of flowers and vegetables in gardens attached to the school, where such are available. Plants and flowers should be studied objectively, and their structure explained. Their life and habits should be illustrated from plants grown in bottles, pots, and boxes, in water, sand, sterile or fertile soil. The effects on growth of light, air, warmth, and moisture should also be demonstrated. Lessons should in every case be appropriate to the season of the year, and neither teacher nor pupil ought to rely upon text books. Again and again the late Professor Huxley stated that, if instruction in the elements of natural and physical science were to be mere bookwork, it would be wiser not to attempt it. 'Unless what is taught,' he said, 'is based on actual observation and familiarity with facts, it is better left alone.' Every one is aware how much the teaching of botany has suffered hitherto from this defect. Children should be led to make their own investigations; they should be told as little as possible and made to discover as much as possible. In other words, the process of education should, as one of our profoundest thinkers has said, be largely one of self-instruction. Any piece of knowledge which the pupil has himself acquired, any problem which he has himself solved, becomes by virtue of the conquest much more thoroughly his than it could else be. 'Savior par coeur n'est pas savoir.'

"That nature-study should occupy an honorable place in all education, hardly admits of question. Instruction of every kind has two values: its value as knowledge, and its value as mental discipline. 'We are all coming to be agreed,' as Matthew Arnold said in 1878, 'that an entire ignorance of the system of nature is as gross a defect in our children's education as not to know that there was such a person as Charles the First.' And it is unnecessary to insist upon the importance of even an elementary knowledge of the principles of natural and physical science. As a mental discipline,

nature study perhaps more than any subject trains and strengthens common sense. It stimulates the reflective faculties, for which books alone can effect little, but from which spring intelligence and judgment. It utilizes and guides aright that spontaneous education which begins with our earliest years, when the desire to investigate our surroundings is paramount. It has been truly said that man has a great deal of curiosity, but very bad eyes. The first business then of nature study is to teach the child to open his eyes and how to use them. Every teacher is familiar with the child's restless observation, which, instead of being checked or ignored, should be diligently ministered to. Those powers of observation should be systematically cultivated. We shall thus be laying the foundations of that process of acquiring knowledge on which all subsequent knowledge ought to be based, and shall be whetting the appetite for information in proportion as we encourage, and direct the natural tendencies of the mind. This is to make the acquirement of knowledge pleasurable, and is the secret of all successful teaching. It is the surest means of leading our scholars to continue through life that self-instruction in which we aided them as tiny children, and it will free us from the reproach of worshipping the symbols of knowledge rather than knowledge itself. 'If there is a more worthy aim for us than to be drudges,' Herbert Spencer tells us, 'if there are other uses in the things around us than their power to bring money—if there are higher faculties to be exercised than acquisitive and sensual ones—if the pleasure which poetry, and art, and science, and philosophy can bring are of any moment—then it is desirable that the instinctive inclination which every child shows to observe natural beauties, and investigate natural phenomena should be encouraged.' "—John C. Medd, in The School World.

XII.—COURSES OF STUDY.

The draft of proposed changes in the Public and High School courses of study has been before the profession since last April. Every opportunity has been given teachers, inspectors and other educationists to examine the curriculum, and to suggest any needed improvements in what is proposed. I deem it unnecessary to say that modifications of the courses of study now followed have become necessary. Apart from general educational progress, the conditions of our country and the changes in the conditions of society have rendered imperative a revision of the work prescribed for both High and Public Schools. The growth of democracy and the development of science have perhaps been the main factors in calling for a re-adjustment of school work. Doubtless the value of the training given in our schools does not depend so much upon the knowledge gained, as the habits which the pupils form. It is a fact, however, that there are differences in the educational value of the various subjects. It may be a debatable question, what knowledge is worth most. The branches of the school programme cannot be divided into "utilitarian" and "culture" departments. The education of no person should be one-sided, although what he is to follow will determine a great deal the work to be taken up in school.

In a country like Canada, it is not easy to determine what pursuit in life the ordinary pupil will follow. Under these circumstances, I think it will be taken for granted that the knowledge early acquired should not be special, but general. The early part of a child's school life should, therefore, be taken up in gaining such information as everyone should have, and in having such habits cultivated as are important in every department of life. The desire to occupy a position of prominence is an ambition that may be laudable. The formation of high ideals is praise-worthy. "Hitch your

waggon to a star" is a sentiment that the good teacher may employ with advantage. At the same time preparation for the work of after life should always be kept in view. To neglect what should be known by the farmer, mechanic, or merchant in the acquisition of what merely concerns the lawyer or doctor, is far from wise. Specialization should have very little place in the programme for our Public Schools.

In accordance with these principles, the proposed Public School course of study gives early prominence to reading, spelling, literature, composition, history, arithmetic, penmanship, physiology and hygiene, drawing and nature study. There is also an opportunitw for the formation of a taste in elementary art, and such powers of construction and mechanical drawing as are begun in the kindergarten, and may be pursued with advantage in the various forms of the Public School. In cannection with nature study, some elementary knowledge of many departments of elementary science may be gained. Indeed, it is safe to say that a child should gain some knowledge of the various natural phenomena that come within the range of his observation.

The course in the Fourth Form includes some elementry knowledge of kook-keeping, as it is presumed every child should know something of how to keep accounts. This course in the subject should not, however, be confounded with that training in book-keeping prescribed in the High School course for those who are to take mercantile pursuits. The economic changes which have given rise to the factory, and which I have discussed in another place, show that subjects which formerly were not taken up in school should now have a place in the programme. A great majority of children may be expected to contribute to the daily labour of the household, the farm, or the shop. Under these circumstances, household science, including cooking, sewing, laundry work, sanitation, etc., should be a leading part of every girl's training in a Public School. The concentration of population in cities has made it imperative that the manual training which the country boy obtains may be taken up as a course of study in urban schools. Household science and manual training should be limited to no class of students. To train the hand and the eye is valuable, and, therefore, the study from books should not absorb all a pupil's attention.

The proposed programme calls for new methods in teaching many of the subjects. More importance will be attached to the work of the teacher and the judgment of the inspector. I fear that our examination system, though productive of some good results, has too often minimized the value of the teacher's judgment, as well as the authority that should be exercised by the inspector. More freedom for a teacher will do good, and greater power for the inspector will be an advantage. The change in methods will be noticed, particularly in literature. There will follow more attention to reading, and the books of the school library will be more in demand. I fear our present High School Entrance examination does not encourage the study of literature, as literature should be taken up. Constructive work, it will be noticed, occupies considerable prominence in the Public School programme. This is fully in keeping with modern ideas of education. Power "to do" and judgment and taste in the operations will have a valuable effect upon the pupils in our Public Schools. The teacher will be required to pay much attention to the cultivation of right habits and temperance will be inculcated in the same way as other good habits, such as truthfulness and honesty. I may here add that the amount of work mentioned in the proposed curriculum appears larger than it really is, on account of being set out very much in detail.

In the High School course of study the fact is recognized that the essen-

tial subjects, or those which all pupils should know are given special prominence in the lower forms, that is in the Lower School. It has been my wish to have such a course of study prescribed for the High Schools as will answer the various classes of pupils enrolled therein. I fear that even at present the course for teachers too largely dominates. This should not be so, and I believe the new programme will serve to moderate what has been generally recognized as an evil. I do not say that the ambition of High School students to become teachers is not praiseworthy. No harm will arise, therefore, if the course of study in the lower forms as prescribed for teachers is substantially the same as that desirable for the masses of pupils. There is ample freedom given to High School Principals and Boards for giving greater attention to subjects which may be deemed specially advantageous to the locality.

"The crux of the whole subject lies in the conception of what education really is. We all define it in theory to be a drawing out and developing of the powers of the mind; but in practice we seem to define it in the terms of the means that we employ. We have come to associate education with certain definite subjects, as if no other sets of subjects could be made the means of educating a mind. One by one, new subjects have forced themselves in as being proper means for educating. All the professions, natural science, mechanic arts, politics, and last of all agriculture, have contended for a place in educational systems, and have established themselves under protest. Now, any subject, when put into pedagogic form, is capable of being the means of educating a man. We are much in the habit of speaking of certain subjects as leading to 'culture,' but this is really all factitious, for 'culture' is the product only of efficient teaching, whatever the subject matter may be. So insistent have we been on the employing of 'culture studies' that we seem to have taken the means of education for the subject or result of education. What a man is, is more important than what he knows. Anything that appeals to a man's mind is capable of drawing out and training a man's mind; and is there any subject that does not appeal to some man's mind? The subject may be Sanscrit, literature, hydraulics, physics, electricity, or agriculture—all may be made the means whereby some men and women are educated."—Professor Bailey.

XIII.—TRAINING FOR TEACHERS.

Ontario has held a unique position in its regulations pertaining to the training of teachers. The advantages of professional training are now well recognized in every civilized country. This Province, however, has attempted with fair success to demand professional training, as well as scholarship, from each teacher engaged in our High and Public Schools. In our County Model Schools, although the shortness of the session is to be regretted, a very good beginning is made by teachers in acquiring some elementary knowledge of pedagogy, including the science of education, psychology and practice in teaching. This work has been carried on at a comparatively low cost, and the experience of a quarter of a century has shown the wisdom of their establishment. Much can be said in favor of having a smaller number of Model Schools and having them better supported from Provincial and municipal funds. A dozen or fifteen well equipped schools in our largest cities and towns would probably answer the purposes better. The present regulations meet fairly well the pressing needs of many localities, and unless the Province is prepared for a considerably increased expenditure, it will be well to continue the present arrangement for the County Model Schools. with such improvments as may be readily carried out.

From representations made to me I was convinced that a session of five months at the Normal School was too short a time to give to professional work for those who desired to obtain Second Class certificates, provincial and permanent. By the lengthening of the session of the Normal Schools, the staff will be in a much better position than formerly to carry on the work of these institutions. The teachers in training will have better opportunities for practice in teaching, and, what is exceedingly desirable, there will be time for a review of the academic work, so far as concerns the Public Schools. The separation of the professional from the non-professional requirements for teachers' certificates has been generally regarded as sound in principle. Although preferable, there are some disadvantages in this arrangement. By means of a year's attendance at the Normal School there will be better opportunity of reviewing the academic work from a pedagogical point of view.

From various causes the attendance at the three Normal Schools is not as large this session as formerly. This condition is partly due to the lengthening of the Normal School sessions, which will only have a temporary effect. On this account a few students were admitted to the Normal Schools who had not the necessary experience as teachers. Our plan of having at least a year's experience from students before being admitted to the Normal School has worked well. The student with experience has a decided advantage over the one who has only Junior Leaving Standing. He has acquired something upon which he can "build" with advantage. The value of some experience in teaching before attending a Normal School is recognized in several of the United States.

The attendance at the Normal College continues to be large. It not only furnishes a sufficient number of assistants for vacancies in the High Schools and Collegiate Institutes, but many of its graduates are employed now in Continuation Classes and in other Public Schools.

"The training of teachers is, from the character of the work, an exception, and for this reason the normal schools are the special care of the Board of Education. Massachusetts believes in the employment of trained teachers, and has provided liberally for this work. Nor can it be truly said that this liberality has been unappreciated. The number of pupils at present in the normal schools is 1,684,—a larger attendance than at any previous time; while the number admitted to the schools this year is greater, with one exception, than in any former year. The normal buildings are modern and finely equipped. As a whole, the schools are provided with adequate training facilities, and for this reason are able to do the best work. Attention is called to the fact that at the normal schools during the last year 6,498, or 46 per cent. of the whole number, had received normal instruction. The outcome must be better work and better conditions in all parts of the State.

"Except in the advanced classes at Bridgewater, there is little attempt to train teachers for high school work. In the judgment of the Board, it is wise to confine such work, so far as possible, to this one school. At Bridgewater the classes are sufficiently large to awaken interest, the traditions of the school favour this grade of work, and there is at hand a body of teachers trained especially in this service. In no other of the normal schools can this work be done to equal advantage. It would seem wise, therefore, if at any time there should be a greater demand for this kind of training, for the State to meet this demand by increasing the facilities at Bridgewater, rather than by building or aiding a new school.

"The training of teachers for the public schools, below the high school grade, is developing year by year, especially along professional lines. The opportunities for this work have increased of late with the better preparation of the entering classes. There is hope also that 'child study,' which has se-

cured much attention for some years past in educational circles, will soon become a little less like the original earth, said to have been 'without form and void,' and so be an actual help in this work; or at least serve to convince those in traing that the development of a child and not of a subject is the real end in teaching."—Massachusetts' Report.

XIV.—QUALIFICATIONS OF TEACHERS.

The qualifications of the teachers in our Public Schools will always be one of the most important subjects coming under the control of the Education Department. Valuable though fine buildings, library and apparatus may be, they can never make up for defects in the teacher's work. The present academic requirements for the lowest grade of Public School teachers do not meet modern demands. The courses prescribed in Science, part of which has been optional and part obligatory, are insufficient as a foundation for the kind of Nature Study work called for by present day educational ideals. The work in drawing and art is also unsatisfactory in both character and extent. Although the outlines of the courses of study in the other subjects are on the whole satisfactory, the academic attainments of the students in these subjects on entering the County Model Schools and Normal Schools are inadequate for the technical requirements of the Public School teacher. This defect is not confined to any one department, nor is it a characteristic of only a few students. My opinion on this subject is confirmed by the practically universal testimony of training teachers and inspectors. Apart from the present requirements for kindergartens, no qualifications are demanded of the teacher which will enable him to utilize the constructive abilities of the child. This defect, however, I need not emphasize, in connection with the academic attainments, for it must be supplied for many years to come in the training schools of the Province.

To remedy these evils and to bring our Public Schools into line with educational progress in other progressive countries, I should urge the following changes:

(1) The standard for pass in all departments should be raised. About the necessity for this change, in the lowest grade in particular, there can be no possible doubt.

(2) A re-adjustment of the courses for teachers' certificates, involving the following changes:

(a) A full course in the natural and physical sciences should be prescribed for the Public School teachers' junior (Junior Leaving) examination. It is also desirable that this course should be made obligatory and not optional. Nature Study work to be worthy of the name must be based on a fairly comprehensive and thorough knowledge of elementary science, and if a proper course of this kind is to be adopted, it follows that all Public School teachers must have a fair minimum acquaintance with the sciences.

(b) A more extended and thorough course in drawing and art should also be made obligatory. This course bears the same relation to the color and art work in the Public School curriculum as elementary science bears to nature study, and is equally indispensable. It is well also to remember in this connection that while with a year's course in the Normal Schools something may be now done there to make up for defects in the training provided in the High Schools, it is manifestly impossible to expect supplementary instruction in the Model Schools as they are constituted, or as they can be constituted for years to come. The work should be done in the High Schools.

I believe the changes mentioned above can be made only by omtting some of the subjects now required at the Junior Leaving examination. I come to this conclusion for the following reasons:

(1) To increase the number of subjects by the indispensable additions noted above and at the same time to raise the examination standard in all subjects would add at least from one to two years to the time now required for preparation. It must be evident that from the time at the disposal of most of the candidates, public opinion would not at present support this course, however justifiable it may be on professional grounds.

(2) The supply of teachers would in two or three years become altogether insufficient. Even under present conditions the number entering the profession has for several years been on the decrease, and owing chiefly to the lowness of the present salaries, and the inducements in other callings on account of the general prosperity of the Province, the number preparing for teachers' certificates in the High Schools is now much smaller than it was some years ago. The average number attending the County Model Schools in 1890-1895 was 1,534, while from 1896-1902 it was only 1,287, being in 1902, 1,171, and as matters stand it is certain to continue decreasing, and, further, there are ample grounds for believing that in a considerable number of the counties at the present time there is a marked scarcity of teachers—a scarcity which will in the immediate future become still greater on the expiration of the Third Class certificates granted on the old primary standing. I am sorry also to add that the scarcity of teachers unavoidably leads to the lowering of the general standard by an increase in the number of temporary certificates. As a result, for example, of the increasing scarcity of teachers since 1896, the number of temporary certificates has been raised from 46 in 1896 to 307 in 1902. There is also a lowering of the standard which comes from issuing District certificates at the request of County Boards.

I believe a higher standard is urgently needed, and if the standard is to be raised in the subjects absolutely necessary to the Public School teachers, it is evident, therefore, that the curriculum must be narrowed at other points. No compromise will secure the desired result, and in this matter the interests of the Public Schools must be paramount. What subjects, then, should be omitted for the lowest grade of certificates? Manifestly those which bear least directly upon the Public School teacher's work and which have under the prevailing conditions least influence on his general culture. The subjects now prescribed, which are of least direct advantage to the teacher are obligatory Latin and the optional languages (Greek, French and German). The evidence from teachers, inspectors, and students goes to show that more time is now devoted to Latin in particular than to any other subject required for the examination. I am justified in saying, from the opinions I have received, that from one-fourth to one-third of the students' time—more, indeed, during the year of the examination—has for years been given to Latin in the High Schools. So far as can be judged by the results of the training given in Latin, the value of the subject to Public School teachers is not at all commensurate with this large expenditure of time.

The lowest grade teachers are never required to teach Latin, and the study of the subject as usually pursued by them at present, not only has little disciplinary value, but is in reality prejudicial to classical education in the High Schools. A recent return to the Education Department shows that of the candidates at the last Junior Leaving examination 18½ per cent. had studied Latin only one year or less, and about 28 per cent. of the remainder, less than two years, and that the average time spent by all the candidates in Latin was less than 2½ years. This condition means, of course, that in most of the Latin classes in the Province, there are a number of pupils who

have begun the subject late and who desire to be possessed of just enough Latin to pass for a teacher's certificate.

With such students this work is simply a cram, and the work in the other subjects is also, as a consequence, of the same character. Under these circumstances, the study of Latin cannot but be distasteful to those who especially profit by it under suitable conditions, while the training which the others receive is from the very nature of the case of comparatively little value. For the very large majority of such students, the work in Latin, it must be remembered, stops at this point. I believe no educationist who knows the situation can hold that the training such students obtain justifies the time spent upon it by the lowest grade of Public School teachers. The only effective remedy for this condition of affairs would be to raise the standard of the examination. This, however, as I have shown, could not be done without such a decrease in the number of teachers as would in a few years leave very many of our Public Schools without teachers, or with teachers holding temporary, extended, or District certificates.

To meet the cases of candidates for Junior Leaving Standing, who have in view higher certificates, or who purpose remaining longer at the High School, it is proposed that Latin should be prescribed as a bonus for the examination. Candidates who make 50 per cent. on the subject will have the marks thus obtained added in determining the aggregate. The exaction of 50 per cent. is necessary, in order to prevent superficial work. To allow also Greek, French and German to be taken as bonus subjects, could not, I think, be defended. If these languages were also allowed to count at the examination, it would be most embarrassing in the classification of pupils in the smaller High Schools especially, which have suffered in many respects by a multiplicity of options. Latin is generally recognized to be far superior as a disciplinary subject, to either of the modern languages, and, therefore, neither French nor German is entitled to the same recognition. For Senior Leaving candidates Latin should be obligatory. First Class teachers should undoubtedly have some training in Latin. Options will be allowed also at the Senior Leaving examinations, between science and one or more of the other languages. First Class teachers, it will be readily admitted, should have some breadth of culture, in view of the important positions in the schools for which they are legally qualified.

The importance of what I have discussed will appear from present conditions. Of the 9,367 Public School teachers in this Province, 5,963 are teachers of rural schools. The rural schools are the ones which are most affected by the courses prescribed. The large majority of country teachers hold the lowest grade of certificate. I deem the needs of the rural schools call for reforms in both the non-professional and professional requirements. It is manifestly impossible, under present circumstances to secure for Second Class teachers adequate culture in the classical or modern languages. It must be remembered that "We are dealing with conditions and not with theories." Should conditions change in the course of five or six years, a reconsideration of the question would be necessary.

I am aware that some persons urge that the "Latin question" is best settled by allowing options. With this view I cannot agree. For the Junior Leaving examination there should be a fixed course with a high standard and the subjects best needed for Second Class teachers and only such subjects should be prescribed. Whatever arguments may be used for making Latin obligatory, those who favour an option between it and science have, I think, no case. A good course in science is necessary, in view of what the teachers in our elementary schools are required to teach. To relieve them from science, if they take Latin, cannot be defended. To allow an option be-

tween a language and science for the teachers in our elementary schools is about as indefensible, as to allow a choice between civil polity and arithmetic. In the opinoin of many persons, specialization is begun too early at our universities. What argument can be used to defend specialization in the requirements for the lowest grade of teachers' certificates? It has also been urged that if a smaller amount of Latin were prescribed, the difficulties would be removed. I have no hesitation in saying that this would only encourage superficial work, and unwisely induce students to take up Latin who will not become teachers and who will probably attend the High School only a year or two.

XV. THE POSITION OF LATIN.

In the Grammer Schools, as the High Schools were formerly called, Latin was an obligatory subject for both boys and girls. The Rev. Dr. Ryerson became convinced that if our Secondary Schools were to be properly supported by the ratepayers, they must in their course of study be adapted to suit modern requirements. Unlike the conditions in Germany, and in most European countries, pupils in Ontario are trained in the same Public and High Schools, irrespective of the professions or calling which they are eventually to follow.

The recognition of these facts had much to do in settling the provisions made by the High Schools Act of 1871. Latin then became an optional subject, and by the adoption of courses of study, wider in range, the High Schools very soon improved in efficiency and popularity. It will be readily admitted that the study of the languages since the year mentioned has not been neglected and the number of matriculants has largely increased. In the United States, although Latin is optional in the High Schools, the number taking the subject has also increased.

In the proposed High School course of study, Latin remains optional. In this respect there is no change from what has been the practice since 1871, when our Secondary Schools were reorganized. At one time Latin was optional for first-class teachers. For many years it has been obligatory, and in the proposed courses of study, it will continue to be obligatory. Latin will, as all along, be required for Matriculation and for entrance to the professions. The subject will not be obligatory for Junior Leaving candidates, but it may be taken as a bonus subject. Provided a candidate makes at least fifty per cent. on the subject, the marks awarded will be counted in making the required sixty per cent. on the aggregate. In this respect a change has been made, and I deemed it necesary to announce the fact and the policy of the Department on the question before the schools opened last September. The propriety of making this announcement is evident since pupils enrolled in September usually shape their courses for the examinations two or three years in advance. The settlement of the Latin question could not in the interests of the schools be deferred. Decision was arrived at only after Inspectors and Teachers and a large committee of the Provincial Educational Association were heard on the matter.

It has been urged, and with much cogency, that of the subjects now prescribed, those which have the most direct bearing upon the teacher's future work in the Public Schools, such as English, Mathematics and Science, suffer from an excessive expenditure of time upon other subjects—notably the foreign languages, which even if mastered, and this mastery is far from being attained, bear but slightly upon the Public School course.

The lowest grade teachers are not required to teach these languages and their study, as usually pursued, has not only little disciplinary value, but is

in reality prejudicial to language teaching in our High Schools. Recent returns to my Department show that a very large number of candidates for the Junior Leaving examination spent one year or less upon foreign languages, and that the average time spent upon these subjects was far too short to acquire any substantial knowledge of them.

Latin is undoubtedly a subject of which the scholar should have some knowledge. Its value as a foundation for the study of the modern languages is unquestioned. To have the mastery of the English language, a knowledge of the classical languages is essential. There is no doubt as to the culture value of Latin. It should be remembered, however, that only a small proportion of the population will ever become learned. It would be folly to expect each teacher in our Public Schools to be a linguist. If Latin alone gives culture, we may despair of having a cultivated people. Perhaps there is nothing concerning which many persons talk so vaguely as upon this question of "culture." While I recognize as much as anyone the value of Latin in promoting general cultivation, I am not ready to admit that culture is necessarily dependent upon any one subject of the curriculum. The cultivated man is especially the one who has formed a high character, who has acquired some acquaintance with that store of knowledge which past generations have laid up, whose constructive imagination has been trained, and who is able to express himself orally, or in writing, with some accuracy and elegance.

Standards of education have varied much from time to time, and the ideal of general cultivation has, in consequence, been modified. Upon this point President Elliott of Harvard University expresses himself as follows:

"Now, if cultivation were an unchanging ideal, the steady use of the conception as a permanent test of educational processes might be justified; but if the cultivated man of to-day is, or ought to be, a distinctly different creature from the cultivated man of a century ago, the ideal of cultivation cannot be appealed to as a standard without preliminary explanations and interpretations." Perhaps no educationist on this continent is more competent to speak on this question than President Elliott. Respecting science, the value of which some persons are slow to recognize, he says: "This recognition of science as pure knowledge and of the scientific method as the universal method of enquiry is the great addition made by the nineteenth century to the idea of culture. I need not say that within that century what we call science pure and applied his transformed the world as the scene of the human drama; and that it is this transformation which has compelled the recognition of natural science as a fundamental necessity in liberal education. The most convinced exponents and advocates of humanism now recognize that science is the 'paramount force of the modern as distinguished from the antique and mediaeval spirit' (John Addington Symonds' Culture), and that an interpretation of humanism with science and of science with humanism is the condition of the highest culture." In connection with the value of linguistic training, the same distinguished educationist expresses himself as follows: "The conditions of the educated world have, however, changed so profoundly since the revival of learning in Italy that our inherited ideas concerning training in language and literature have required large modifications. In the year 1400 it might have been said with truth that there was but one language of scholars— the Latin, and but two great literatures the Hebrew and the Greek. Since that time, however, other great literatures have arisen the Italian, Spanish, French, German, and above all the English, which has become incomparably the most extensive and various and the noblest of literatures. Under these circumstances it is impossible to maintain that a knowledge of any particular literature is indispensable to culture. . . . It has been my object to point out that our conception of the type of culti-

vated man has been greatly enlarged, and on the whole exalted by observation of the experience of mankind, during the last 100 years. Let us as teachers accept no single element or kind of culture as the one essential. Let us remember that the best fruits of real culture are an open mind, broad sympathies, and respect for all the diverse achievements of the human intellect at whatever stage of development they may actually be—the stage of fresh discovery, or bold exploration, or complete conquest. Let us remember that the moral elements of the new education are individual choice of studies and career among a great new variety of studies and careers, early responsibilities accompanying the freedom of choice, love of truth now that truth may be directly sought through rational enquiry, and an omnipresent sense of social obligation. These moral elements are so strong that the new forms of culture are likely to prove themselves quite as productive of morality, highmindedness and idealism as the old."

I think every teacher in our Public Schools should have a fair knowledge of the English language and literature. The present requirements in English are too low. More work should be prescribed and a higher standard exacted. If the time now expended in Latin were taken up with English, Second Class teachers would be better prepared to teach English in the Public Schools. The value of good training in English cannot be over-estimated. In a recent work on the "Teaching of English," published by Longmans, the following views are expressed by the author:

"The result of any such attempt to look at the matter fairly must, I think, in the present state of modern civilization, lead us to see that the burden of proof may justly be laid on the classicists, and they may be asked to show how and why it is that we retain a dead language for purposes of linguistic training and neglect our own language. The first and obvious reply of the classicists to this general argument would be one drawn from experience. Whatever theory may seem to show us, it is undoubtedly true that the apparently roundabout method has been successful. For centuries each nation has been trained in its native tongue by the study of Latin. Has a nation ever been so well trained through its own language? Such an argument, we may reply, would have been some years ago almost unanswerable, though a keen mind might always have suspected that experience, as in so many matters of science, was used to support a monstrous waste of force. Recent experience, however, counts against the classicists. It has been proved that each modern language is, to those who speak it, an excellent instrument for linguistic training. Especially is this true in certain parts of the field of instruction in English. Within twenty years methods of teaching English composition have been put in practice which lead a majority of those interested in education to believe it an exceedingly valuable linguistic discipline, and within ten years certain American schools have been securing equally important results from the teaching of English literature. Half a century more and we may be able to meet the classicists not only on the ground of pure theory, where their case is weakest, but also on the ground of national experience.

"To sum up in a few words, then, the line of thought expressed in the chapter up to this point, we may say: (1) The rightful claim of Latin to be considered as the pre-eminent language of the educated classes in Europe was broken down in the sixteenth and seventeenth centuries, and completely overthrown in the eighteenth; and, similarly, the exclusive claims of Latin to be accepted as the most valuable and one indispensable instrument of secondary instruction have been gradually weakened, during the eighteenth and nineteenth centuries, by the increasing value set on the study of mathematics, the natural sciences, history and the modern languages. (2) It has become more and more evident, from the educational experience of the last twenty-

five years, that much of the good effect secured through Latin as a cultural study may also be secured through the use of history and of literature in the modern languages. (3) While the rivals of Latin and especially history and the literature of the native tongue—have been thus encroaching upon the reputation it had long held as an educational medium, it has become less and less certain that Latin could hold its reputation even in the field where it has usually been regarded as supreme, as an instrument for linguistic discipline. In particular, modern methods in English composition seem to shows that this is, in proper hands, an extraordinarily effective instrument. There is a somewhat widespread feeling, moreover, that the study of English grammar, particularly on the historical side, and of the earlier forms of the language, may be so systematized as to yield as remarkable results as has the recently systematized study of English composition."

Inspectors and teachers are not alone in Ontario in urging that the study fo the classics should not be taken up by those who are not likely to continue the subject for any length of time. The following opinion is taken from the Massachusetts Report:

"The secret of good school work is to have the pupils feel an interest and a purpose, and a capable teacher can accomplish this in one course as well as another; but it cannot be done by belittling all courses except the classical, and by manifesting to pupils a feeling of humiliation at being obliged to teach them. Indeed, it is the pupil who is taking a classical course, with no intention of continuing his studies beyond the High School, that generally has neither interest nor purpose, and is generally likely to become an idler; and many a good student has been spoiled or driven out of school by having been unwisely led into taking classical studies. I would not be understood as arguing against such studies for those who want them; they have an undoubted educational and intellectual value. The college-fitting course is well enough if it is supplemented by the college; otherwise, it is generally a decapitated education that too often makes for ignorance; it is apt to cultivate in the pupil the narrow notion that languages are about the only things worth learning, and it not infrequently educated the pupils out of sympathy with nature."

It is interesting in this conection to notice the views of the late W. E. Gladstone regarding the advantages of a classical education, and to observe that such a distinguished classical scholar as that famous statesman recognizes a proper limitation as to the classes of pupils who should study the Latin and Greek languages. In Morley's life of the great statesman and scholar, we have on page 648, volume II., Gladstone's words on the question of a classical training:

"It must, of course, be kept within its proper place, and duly limited as to things and persons. It can only apply in full to that small proportion of the youth of any country, who are to become, in the fullest sense, educated men. It involves no extravagant or inconvenient assumption respecting those who are to be educated for trades and professions in which the necessities of specific training must limit general culture. It leaves open every question turning upon individual aptitudes and inaptitudes, and by no means requires that boys without a capacity for imbibing any of the spirit of classical culture are still to be mechanically plied with the instruments of it after their unfitness has become manifest. But it lays down the rule of education for those who have no internal and no external disqualification; and that rule, becoming a fixed and central point in the system, becomes also the point around which all others may be grouped."

XVI.—MANUAL TRAINING AND TECHNICAL INSTRUCTION.

Considerable progress has been made during the year in the formation of Manual Training and Technical Classes in connection with various Public Schools and Collegiate Institutes throughout the Province, and the interest in these newer and more practical studies, noted in my last report, has been well maintained and continues to grow more rapidly than might reasonably have been expected.

Five new schools have been opened, and many other places, notably Galt, Peterborough, Owen Sound, Waterdown, Stony Creek, Amherstburg and Chatham are giving earnest consideration to the matter with a view to its early introduction.

If this rate of progress be maintained, the prediction made last year that "it is not improbable that before long in every large centre of population in Ontario there will be found provision for giving instruction in the knowledge and principles of the sciences and their application to industrial enterprise" will soon become an accomplished fact.

The aid granted by the Legislature has been much appreciated and has had a great deal to do with stimulating the growth and progress of these schools, which have now become a recognized part of every educational system in the world.

Schools and classes are now established in the following towns and cities: Ottawa (8), Toronto (6), Kingston, Stratford, Brantford, Woodstock, Renfrew, Cobourg, Berlin, Essex, Guelph, Brockville, London, Ingersoll and Hamilton, giving a total of 27 rooms efficiently equipped for elementary and advanced woodwork.

Accommodation is thus provided for 580 students to take practical bench work at any one time, and the total number registered throughout the Province is 4,500 and these receive instruction in periods varying from one to four hours per week.

Not only has the increase in the number of centres been gratifying, but the progress in the character and scope of the work undertaken has been still more advanced, and is developing from purely Manual Instruction to what may be more properly called Technical Education directly applicable to trade and industry. The proper and logical course has thus been followed, for it would have been a useless waste of time, effort and money to have attempted the higher branches of Technical Instruction unless there was a sound, practical education to begin with and simple folly to attempt to raise a superstructure unless there was a good foundation.

Wood and metal turning lathes, driven by foot and power (electric motors and gas engines), forges, drills, jig saws and other machinery for advanced metal working are installed in Kingston, Brantford, Stratford, London, Berlin and Toronto.

In each centre the instruction given has special reference to the industrial requirements of the district and cannot fail to have a material influence on its development.

Perhaps the latest development is being made in the town of Berlin, where an excellently designed building, to cost $25,000, exclusive of equipment, is nearing completion. The erection, which it attached to the High School, is intended to be used for the purpose of giving instruction in advanced technical subjects as well as educational Manual Training, and the equipment and plans proposed bid fair to render it a decided acquisition to the educational institutions of the Province.

A three year's purely technical course has been established in connection with the Collegiate Institutes at Kingston and Brantford and is doing work

which cannot fail to have a material influence upon the industrial life of those communities. The work of these courses is entirely distinct in aim and purpose from those of the ordinary academic course and is taken by those students who intend to devote themselves to industrial life. The larger Collegiate Institutes of the Province might with considerable advantage devote some attention to the development of this feature. The teachers engaged in advanced work are looking ahead. Five of them spent their summer vacation in taking advanced courses in advanced Metal work in some of the best technical schools in the States, thus equipping themselves for the higher branches.

Not only is this advanced work receiving attention and recognition, but practical instruction is being given, in the lower forms of the Public Schools, in elementary mechanical drawing, cardboard work, clay modelling and basketry, with the idea of developing accuracy, individuality, ingenuity and skill, upon which can be built sound Manual Instruction and real Technical Training.

The best example of completeness in this respect is that afforded by the town of Brockville, which has a well organized course of practical work, from the kindergarten to the termination of the boy's Public School life.

The Ottawa School Board has appointed a teacher whose work is entirely devoted to what may be called elementary or preliminary Manual Training.

Classes for Public School teachers have been organized in Ottawa, Toronto, Stratford, Brockville and Cobourg, and the teachers of the Province generally are rising to the occasion and seriously equipping themselves for the newer studies.

The Macdonald Fund, which has done a useful and admirable work, expired in June last and presented equipments to the different municipalities where the work was carried on under its auspices. In all sixteen equipments were thus donated to the authorities in Ottawa, Toronto, Brockville and Brantford. The Education Department has now full control of the whole field in the Province and is devoting its energies to its further development.

An efficient equipment has been placed in the Normal College at Hamilton, and this with the excellent facilities at the Normal Schools in London, Ottawa and Toronto (where new rooms have been erected and additional equipment installed) may reasonably be expected to do something towards supplying teachers capable of giving the necessary instruction.

The attention of the more progressive male teachers in the Province might well be directed towards equipping themselves for all branches of this work, as here is a field in which their services will be always in demand and high qualifications receive due recognition.

Throughout the whole Province the grade teachers are most sympathetic and are seeking to acquire a knowledge of the principles and practice of the work. In continuation of the practice followed in previous years a summer school was held at London Normal School. Manual Training was one of the leading subjects. Much good work was done and interest was aroused and intensified. It is gratifying to know that Manual Training is beginning to be looked upon, not as an isolated subject, but as one having an integral connection with school and home life, as it is only when treated in this way that it is capable of its highest achievement. Summer Schools can accomplish much in this direction and materially aid in securing the interest and co-operation of the grade teacher.

Great interest was aroused at the Dominion Exhibition by three rooms fitted up as Kindergarten, Household Science and Manual Training Class rooms with classes of boys and girls at work under the same conditions (as

far as possible) as obtain in the Public Schools. This was managed by the Department and has done much to give an adequate idea of the place and purpose of the work in our educational system.

Altogether the progress of the movement may be considered as most encouraging and it is the intention of the Department to stimulate by every means in its power its further extension.

A complete report of the whole movement is given in the special report of the Inspector, which will appear in Part II. of this Report.

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In previous Reports I quoted extensively from British and American writers regarding the value of Manual Training. The views of the distinguished Principal of the Ontario Normal School, Dr. J. A. McLellan, on the subject (its value and its limitations), as given recently in an address, are as follows:

"The Education Department has at length made complete provision for Manual Training, including domestic science, in the Ontario Normal College. The practical equipment for this purpose is at least as good as any in the country. This new departure is plainly in the interest of the higher professional training of teachers. It has from time to time been intimated by some 'educators,' who are not in sympathy with the Ontario Normal College and the professional training of teachers, that the instruction given in the College is not sufficiently 'practical'; that too much attention is given to the psychology and philosophy of education. This has no foundation in fact. Though the O. N. C. has not had a practical department in manual training, etc., it has in its teaching emphasized the necessity of Manual Training in a properly organized curriculum. In fact, the aim and spirit of all its work are given in its comprehensive motto, "Learn to do by Knowing and to Know by Doing." It is perhaps the only institution in this country, perhaps on this continent, that has constantly striven in theory and, as far as possible, in practice to act up to the spirit of its motto. This is as it should be; for through the O. N. C. men and women of the highest culture are now entering the teaching profession. These will be teachers in our High Schools and Collegiate Institutes and directors of the public school education of the country; that is, they will be the teachers and directors of our teachers. If, therefore, Manual Training and Domestic Science are to contribute their highest and richest effect in the education of our people, it seems clear that the O. N. C. ought to be in the vanguard of the movement. Teachers of the new 'studies,' Manual Training, etc., need professional training quite as much as teachers of purely academic studies.

"The institution attempts to take a rational view of the great problem of education as involving both psychological and sociological facts and principles. Our educational system is sometimes hastily condemned as having fallen far short of the promises of its administrators and the expectations of the public. To outsiders, listening to the crude criticisms of the system, and the unjust statements of its results, it must seem that the word failure written in capitals would properly describe it; and that the only way to improve it is to follow the absurd suggestion of Pestalozzi: 'Turn the car of human progress completely around and drive it in the opposite direction.' Than this sweeping condemnation nothing could be more unjust. The problem of education is the most intricate ever submitted to the heart and brain of man. The improvement of a national life by means of education is necessarily a slow and difficult process. The school is a complex organ, evolved by a complex organism, and evolution is never by leaps and bounds. If our educational system has not produced the best possible results, has not come up to the earnest

expectations of its founders and administrators, it is chiefly (1) Because it has been unable to provide thoroughly qualified and accomplished teachers; and (2) Because in the organization of school curricula the whole man has not been taken into account; that is, the constructive activities of the human being and their relation to mental action, upon which all depends, intellectual, physical, moral, social, have not received anything like adequate recognition. A third reason might be mentioned, exaggerated criticism and unreasoning opposition on the part of its opponents, and perilous indifference to the education of their children, on the part of the people in general; an indifference which one fact alone is sufficient to prove, namely, the starvation salaries which are paid to teachers. The teacher cannot live by bread alone, but he cannot live without bread. Without efficient instruments, teachers strong of soul and strong of body, no system of education devised by the ingenuity of man can ever be successful. The school houses may be palaces; the curriculum may be revised, enriched, strengthened, may contain everything that is needed for an all-sided human culture—it will be as barren of good results as the most meagre curriculum, unless supplied with what John Stuart Mill calls the instruments indispensable to the success of any system of national education, (i. e.) properly trained, disciplined and cultured teachers. The renovated curriculum alone cannot, as some seem to think, be our salvation.

"The Ontario Normal College has always maintained, and it is likely always will maintain, that Manual Training in its true sense should form a real part in a curriculum of liberal education. There has been a mischievous divorce between brain and hand arising, no doubt, from an unphilosophical dualism, not to say direct antagonism, between nature and man, things which cannot be put asunder in sound thinking.

"The defects in education which are the outcome of this one-sided conception of the nature of man, having at last made themselves felt, the cry is now for reform, and we have entered upon an era of reform. But what is the ideal of the reformers? Is it an ideal based upon a clear comprehension of the broad principles which underly individual and social progress? From present indications, that is, from text books, lectures by reformers, etc., etc., it is to be feared that the history of educational reforms is to repeat itself. There is likely to be a quick passage from one error to the equally pernicious error of the opposite extreme. The gulf between hand and brain, between knowing and doing, between theory and practice, created by a false philosophy and reflected everywhere in social life, is likely to be maintained or even widened; and for the defects flowing from one partial view of education we shall have the equally grave defects flowing from another. Manual training, etc., is to be the life and soul of education. If, in the past, there has been too strong a tendency to exalt brain and culture, and to look askance at hand and labour, for the future, there will be too great a tendency to exalt hand work and look askance at brain work. The motto for the dawning era is to be, it would appear, 'Down Brain and Culture, Up Hand and Labour.' The policy of this 'reform,' like every policy based on but a fraction of the truth, is already doomed to failure. Is it impossible to close up the gulf between the two activities? Must we have our vision forever focussed upon one little facet of many sided truth? Can we not rise to a clear view of the larger truth that there is no antagonism between science and culture because there is no antagonism, but rather a correlation between hand and brain, between thought and action, between theory and practice, between the constructive activities and art? Are we to be forever guided by half-truth visions and so make exclusive brain training or exclusive hand-training our goal? The very name manual training is suggestive of the half-truth view, that is, sug-

gestive of an entirely inadequate conception of the nature and process of education. Under this conception manual training, whether treated theoretically or practically, is regarded simply as another study introduced into an already crowded curriculum, and intended to supplement its deficiencies as being not practical.

"A pressing need of the hour is, therefore, a thorough revision of our conceptions of the relation between knowledge and action, between brain work and hand work, betwen culture and discipline, so that the special branches of the curriculum which deal with each shall reinforce each other, and make clearer and broader the general idea of education. This means the broad question of the relation between the scientific branches of the curriculum and those ordinarily classed under the head of the culture branches, especially history and literature: and this again is based upon the fundamental problem, What is the nature of the connection between the constructive activities and art?

"The arguments for the introduction and justification of manual training as a necessary part of a properly organized course of study, should be based on philosophical data as determined by a solution of the problems stated in the preceding paragraph. Instead of this, we have, as already said, reasons grounded on a very inadequate conception of the true nature and process of education. The course of study and instruction it is said is too intellectual; we must have more of the practical, something that smacks of work. It is too theoretical, depending altogether on books and book learning, and fails to prepare the child for making a living; we must have a more direct preparation for the actual struggle of life. It is too abstract and ideal and, therefore, without interest to the child; we must have a little sawing, hammering, nailing, baking and sewing in order to arouse interest and save the child from the horrible pit of disgust with school and study into which he must sink without this saving hand work. Now, it is better to have manual training introduced and defended upon these grounds than not to have it introduced at all. But one-sided truth leads to one-sided practice and meagre results. That manual training may win its proper place as a humanizing study in the new curriculum, and exercise the best possible influence on education both in itself and its relation to other studies, a broader view of the question founded on the psychology of the individual and of society, must be taken. These manual training studies as affording in themselves a partial but useful training must be treated as having an organic relation with the academic branches, mathematics, science, history, literature, and as being essential in a truly liberal education.

"Briefly, the basal reason both from the psychological and socialogical point of view for making these studies a vital part of the school work is this; they begin at the proper starting point as fixed by the constitution of the human being; they begin with the motor side of the innate tendencies towards expression, and towards the mastery of the environment. They reflect in fundamental and typical forms the means and processes by which man has won the mastery of himself and made possible his progress in civilization and social life. The child is at the outset almost entirely a motor being, a creature of impulse. He does not proceed from ideas to action, but from action to ideas. He is not even conscious of his sensations. His instinctive curiosity manifests itself in practical directions; that is, he pushes and pulls and tears and throws and strikes, etc., without having any idea of the end to be reached, or of the means by which it is reached. He is a Doer and not a Knower. His vague curiosity, or vague desire to know, is immediately manifested in something which he tries to do. A child is from the beginning an experimenter with things. It is only through the movements of his bodily

organs, especially his hands, that he comes to know anything. No child is ever satisfied with any supposed knowledge about a thing until he has got it into his hands and tried to do something with it. A hat is a thing to be put on, a ball something to be thrown or rolled, a drawer something to be pulled out, a spoon and cup something to make a noise with, and so on indefinitely. He gets his first dim ideas by Doing; that is, from an impulsive action. The process of growth in his first stage is from action to knowledge; and as he matures, from knowledge to action. It is largely so with the adult; he is primarily a Doer, a Worker, and passes from the doing of things to the ideas which the doing expresses. Man may be defined as a being who works. His instructive working, first of all, leads to doing with a vague conception of the end in view, and a more or less conscious selection of the means by which the end is accomplished. This is a wise provision of nature. Neither the child nor primitive man is concerned in the first place with ideas as such. He is concerned with something far more important; how to provide food and shelter and clothing and safety from his enemies. 'This definition of man as a worker simply means, in other words, that life cannot maintain and continue itself except by a continuous making good of its own wastes and losses.' All life requires food. This food is used up in the various kinds of energy which accompany life. Unless, therefore, this exercise of energy serves to renew the food supply the man ceases to exist. This is true not only in the most literal and material sense but is equally true of the moral and social life. These considerations put manual training studies entirely above the line of mere technical pursuits, and remove from them absolutely the reproach that they are not liberal because they aim only at preparation for certain trades. It is often argued as a strong reason against the introduction of manual training into the curriculum, that it is not the purpose of the public schools to make seamstresses, or cooks, or carpenters, or mechanics, or skilled workers of any class whatever, but rather to make good men and women, that is, good citizens. The objection would be unanswerable if this were the only ground upon which the teaching of these subjects can be urged. But if they represent the fundamental processes and instruments through which man as a social being has made himself what he is by the subordination of nature to human ends, they can at once claim a liberal meaning and a culture value for themselves; and more than this, they can claim to afford a basis for the correlation of the other branches of the school course—they can be the primary mode of rational instruction out of which the others differentiate. Manual training does not turn the school into a workshop, but it does make the school a better preparation for the workshop; and at the same time lays the foundation for the very best human culture. Man in following the instincts stimulated into activity by his environment which supplies food, shelter and clothing, which furnishes materials for defence and shelter, becomes conscious of himself as an end, and becomes possessed of the idea of making things and this forces means to achieve this end. He gets a certain amount of control over himself and over his environment. He clearly sees how he has been able to subordinate things and their forces to the life process. He realizes the potency of ideas and ideals; he is becoming the minister and interpreter of nature, and nature is becoming his willing servant; this greatly accelerates the rate of progress, and by making it stand out as a distinct end takes it out of the region of accident into that of intelligent self-control; in other words, the most effective tool in subduing the environment is the idea of tools. It has been already said that manual training in the true sense of the word, intelligently taught as an organic part of the whole school source, may be correlated with science, mathematics, history and literature. This will be more fully shown in a later article.

"For the present we must be satisfied with some brief remarks showing its bearing upon mathematics. Everybody knows, for example, the unsatisfactory results of the teaching of arithmetic, especially primary arithmetic, in the schools. As an illustration of this we may quote a prominent public school inspector as stating that one-third of the time of the pupils in his inspectorate is spent in the study of arithmetic alone, and that after all they acquire very little practical knowledge of it and get very little discipline from the study. His remedy is to shorten the time spent on arithmetic, no matter what the consequences may be. It does not seem to occur to him that the barren result which causes him such vexation will be more barren, if possible, with a shorter period spent in the study. It might have occurred to him that there must be something radically wrong in the method of presenting the subject. The teaching of arithmetic is, like that of a good many other subjects, radically wrong in its first steps, and is, therefore, radically wrong throughout, and must be almost worthless in its results as discipline, and all but useless as a preparation for practical life. The cause for these regrettable results in arithmetic and other branches is that the methods are totally disconnected from the child's experience and, therefore, have little or no meaning for him. The maxims, 'We learn with what we have learned; we pass from the concrete to the abstract,' are no doubt perfectly valid. But what is this instrument of learning, the real nature of this 'What we have learned'? What is this concrete which is our starting point for the far goal of the abstract? It does not mean, what it is commonly believed to mean, to pass at a bound from concrete things actually before the child to the higher form of thought, the abstract, which is the result of development. It may be stated as a law from which there is no escape that all education worthy of the name is a process of remaking experience, enlarging, defining and enriching it. This is only another way of stating the first maxim. The concrete that we start from is that portion of the child's experience which bears upon the thing to be learned. The tool of learning—what he has learned—is really learned only when it is part of his own intelligent experience, in other words, the product of his own self activity. Otherwise there is no real learning.

"It is said 'use objects,' as if concrete objects means concrete ideas of things. As said before the concrete we start from is what is already in the child's mind made from his own experience. This heaping together of shoe pegs, splints, and so on, and separating them into parts again, has no real significance for him. For, in fact, this shoe peg and splint business does not form any important part in human experience. Thus the number lessons not being based upon the child's own experiences, simple as these may be, can lead to no clear idea of the real nature of number: there is no evolution of that idea, because there is nothing to evolve it from. But there is something in his daily experience on which lessons in number may be based. He has had experience in measuring and weighing and counting and dividing into parts or in seeing others perform these operations for a definite purpose. And so, starting from these little experiences the teacher by rationally presenting the subject, can easily and with great interest to the child lead him to a working idea of number. Every lesson will be of vital interest to him because it appeals to his own experience and arouses self-activity; and, therefore, is full of meaning. And every successive phase in the development of number will have a truly educative influence for him as having its beginning, continuing and ending in his own self-activity. It will not require a third of a child's school life to acquire a practical facility in the use of number, while at the same time getting out of the study all its worth as discipline.

"At present the operations with number are a meaningless manipulation of meaningless symbols, or of meaningless 'things.' Now, manual training

exercises, if wisely directed, that is, if the teacher has a clear conception of how and why Doing reacts on Knowing and Knowing on Doing, will 'Change all that.' It is quite impossible for the child to grasp, at the outset, abstract relations, that is, relations of a purely intellectual kind, or relations which exist between things as things. He cannot perceive relations—he simply perceives connected things. The power to pass at once from related objects to the conception of their relations is, as before said, a growth or development from his own practical experience. When he has set before him a practical end, that is, an end to be reached only by doing—by a series of connected acts with things—a large number of facts entirely separate as facts are brought together and unified. From this practical attention, this actual doing with things, this performance of separate acts leading up to a single end—is gradually developed the highest power of attention of which the human mind is capable. Manual training begins the development of the fundamental intellectual activity in the only normal way.

"Suppose a simple bit of carpentry, e.g., the making of a box, has to be done. The box is to be of a given size, of such a length, breadth and depth; there has to be preparation of the several pieces, each must be of a definite length, breadth and thickness. The foot rule or other scale of measurement must be used; a piece long enough for the two sides must be selected, also one for the top and bottom, one for the two ends; the piece for the two sides must be divided into two equal parts, for the two ends, etc. This means that number, the tool of measurement, is used in actual construction by the pupil himself. The vague idea of number—perhaps as mere counting—which he has derived from daily observation, grows in definiteness; and this rational idea of counting (relating) things grows into the true idea of number, the idea of ratio, which makes it an instrument for determining values in industrial life, for determining the materials and processes in scientific work, for facilitating the preparation, production and distribution of commodities which is the chief concern of human activity, in a word, which brings the world into subjection to man. With such actual experiences in number and number processes there is real concreteness; there is fixed in the number consciousness the true idea of number as measurement; the passage to the abstract is so easy as to be undiscerned. This method properly carried out, we shall hear no more of the 'vexation' of multiplication, or of the incipient madness in fractions. The very fingers will know multiplication and fractions.

"It will be observed that this process of construction is not only the development of the number idea, but it exemplifies the fundamental law of the mind's action in passing from the concrete to the abstract; that is, in passing from some experience already realized to some new experience which it is desired to have. This is a primary law of mental action. First we have unconscious growth towards grouping or unifying facts, then conscious recognition of the classes and laws. In primary and secondary education, in all education, there must be acquired a certain expertness in using ideas and then a conscious investigation of the how and why of the operations.

"To sum up briefly, we are in favor of manual training because:—

"1. It begins right. It begins with the motor impulses and the tendencies to expression which are innate in the human being. From these spontaneous impulses to do, the learner passes to the ideas and relations which underly the doing. In these ideas the intellectual element reacts upon the practical—the doing—and the hand becomes more skilled as the brain becomes more cunning; that is, grasps more clearly ideas and more clearly conceives the end to be reached and the means of reaching it. This is in accordance with the universal law of progress. Art, or the practical

doing of things, precedes formal knowledge, and primitive doing is not final. There comes a consciousness of the ideas underlying the primitive doing, and science is born—without which there would be no development of the industrial arts nor even of the so-called humanities.

"2. It continually calls into exercise the primary intellectual activity, that is, the one mode of action the synthetic- analytic which is common to all, alike to the most simple and to the most complex.

"3. It helps to realize the true idea of education as the remaking of experience, that is, making some experience already had by the learner the means of realizing a new experience in such a way as to develop self activity and self control, that is, character.

"4. It does this in the only effective way, namely, by having the child pass from action to idea from idea to action: and by constantly leading to the expression of his ideas, reaching the best results with the least waste of power. In book learning the child is too subservient to the mere handling of symbols. He never gets behind the symbol to the intelligent grasp of the image or idea as a product of his own self activity. He is handling an unknown tool for an unknown purpose. In Manual Training both brain work and hand work are concerned. There is a constant interaction between the two activities till at last there emerges a perfect mental image of what the hand has been doing and how and why it is doing it. More than this from the accurate mental images which arise from this accurate hand working, there is ultimately formed the habit of accurate mental imagery; and thus there is put into possession of the young thinker an effective known tool for the accomplishment of a known end.

"5. It affords a sound basis, perhaps the only basis, for the philosophical correlation of the purely intellectual branches of the curriculum, science, history, mathematics, art, literature.

"6. Affording a sound basis for the correlation of studies, and from the beginning, training the primary activity of mind in the only way in which it can be rationally trained it develops increased power and facility for the attack and mastery of any other branch of the curriculum. Instead of asserting, therefore, that manual training is a subject of doubtful value introduced into an overcrowded curriculum, the real truth is that manual training is a practical subject—habits of right working leading to habits of right thinking—and, from its relations with the basal mental activity, it will prove a wonderful time-saver in regard to the other branches. It enriches the curriculum with what is an essential in the development of the individual as it was in the development of the race; and, therefore, practically shortens the curriculum while apparently enlarging it.

"7. Its value on the moral side of education can hardly be over estimated. The moral results of the present methods are very disappointing. The high purpose of education is, or should be, the socializing, that is humanizing, of the individual. The school workshop is a place where this socializing process is greatly facilitated. The social instinct is developed. All are interested in the work of one and one in the work of all. But more important still, the initiation of all into some of the fundamental and typical processes by which civilization had its beginning, by which it is maintained, by which it will be advanced, is necessary to the development of true human sympathy in all: that is, to the foundation and development of the ethical life of society, which, once more, should be the paramount aim of any educational system. The growing friction between those who labor with their hands and those who do not, would surely be lessened if all had at some time, in a free, liberal and educative way, participated in productive labors. To be real and effective, human sympathy, which is the basis of

human character, and the prime necessity in the development of a higher quality of national life, must have a common background, and share in a common experience. It is hardly too much to say that our present industrial and social evils are ultimately traceable to defects in our educational teaching. Comparatively little is done to develop moral ideas, to foster the growth of broad and generous sympathies and to improve the quality of the moral life. As has been said, 'it is by education that the fundamental and most permanent adjustments of the individual in the social relations are effected; and so long as education tends to the divorce of individual power and social service, or of individual power and social interpretation, so long will society present a division into classes, one of which does the necessary work of life, but does it in a mechanical and servile way because ignorant of the social meaning of that word; while the other tends to monopolize the outcome of that work, its real worth and value, holding them a selfish gain or personal accomplishment.' The most fundamental and harmful division between the rich and the poor is that between the intellectually and artistically rich and poor. Society can stand for a long period an unequal division between classes as regards material wealth, but it cannot long endure a division which results in one class doing the productive work, but not sharing in the moral and social value of that work; while another class appropriates the value, but renders back little or no social equivalent. Such a separation is immoral and presents a disintegrated, or disintegrating society.

"Manual training in its best sense then should form a part in every liberal education. The result would be better Knowledge, better Discipline, better Culture- the outcome of a clear idea of the organic unity between Science, the constructive Activities and the Humanities, History, Literature and Art. For Knowledge, Discipline, Culture, are not three things but one: and this perfect unity of the educative process constitutes the perfect man: Culture being the expression of the other two in a rich Service of Humanity —a service which has in it something of the Divine. Through such service we may attain to a vision of God:—

" 'Gods fade, but God abides, and in the heart of man
Speaks with the clear, unconquerable cry
Of energies and hopes that cannot die;
We feel this sentient self the counterpart
Of some self vaster than the star-girt sky;
Yea, though our utterance falter, though no art,
By more than sign or symbol, can impart
This faith of faiths that lifts our courage high,
Yet all these human duties, human needs
Love, charity, self-sacrifice, pure deeds,
Tender affections, helpful service, war
Waged against tyranny, fraud, suffering, crime,
These ever strengthening with the strength of years,
Exalt man higher than fabled angels are.' "

XVII.—CONCLUSION.

The foregoing remarks refer to some of the questions which have engaged my attention during the year. Education is one of those subjects which continually call for development and progress. In other countries on this Continent, as well as in Europe, educationists are dealing with many problems demanding solution. It is too much to expect finality regarding matters that concern the home, the school and the state. I am afraid people do not yet fully realize the great field for usefulness open to the teacher. As the country prospers financially, we should look for a larger expenditure in various departments of education. History has taught us that to train the individual to live with his fellows in social purity, industrial peace and

civic justice is the real work in the building of a nation. The training of the individual cannot be the work of any single generation. Our ideals of what Canada may become should be high, but we should see that measures necessary to secure our ideals are not overlooked. Our schools and colleges with limited resources have accomplished much. Much more may be accomplished if greater liberality is shown by the Province and the municipality.

For various matters of interest in education in Ontario, I must refer the reader to the statistical tables. The reports on technical education by the Inspector, and on Household Science by Mrs. Hoodless, the report of the School of Practical Science and that of the University, as given in Part II. of this Report, will justify a careful perusal. During the year a Summer School in the interests of teachers was held at London, with similar objects to that held the previous year in Toronto. I have in view for 1904 some plan by which even greater advantages may be secured by holding such classes. Many of our teachers, through lack of facilities, did not formerly receive training at the Normal Schools in Manual Training, Nature Study and Domestic Science. I believe it will be the part of wisdom to make up for this loss by having classes formed at suitable centers during the present year.

In order that the statistics for our High and Public Schools should be brought as soon as possible to the attention of the public, the Annual Report is divided into Parts I. and II. The information given in Part II. will consist of several valuable reports, together with statistics not available until after the close of the year. This portion of the Report will also be published at as early a date as possible. I have the honor to be, sir, your obedient servant,

RICHARD HARCOURT,
Minister of Education.

Education Department, Toronto, January, 1904.

APPENDICES.

APPENDIX A.—*STATISTICAL TABLES.*

THE PUBLIC SCHOOLS.

1.—Table A.—School Population, Attendance, etc.

Counties. (including incorporated villages but not cities or towns) etc.	School population between 5 and 21 years of age.	Pupils under 5 years of age.	Pupils between 5 and 21 years of age.	Pupils over 21 years of age.	Total number of pupils attending school.	Boys.	Girls.	Average daily attendance of pupils	Percentage of average to total attendance.
1 Brant	3,926	7	3,082	.....	3,089	1,654	1,435	1,661	54
2 Bruce	15,250	21	10,687	11	10,719	5,573	5,146	5,937	55
3 Carleton	7,741	15	6,648	6	6,669	3,489	3,180	3,283	49
4 Dufferin	5,715	22	4,573	.....	4,595	2,434	2,161	2,092	46
5 Dundas	5,288	25	4,418	1	4,444	2,252	2,192	2,489	56
6 Durham	5,044	9	4,619	.....	4,628	2,329	2,299	2,450	53
7 Elgin	7,463	13	6,120	.....	6,133	3,177	2,956	3,298	54
8 Essex	10,479	19	6,715	.....	6,734	3,456	3,278	3,491	52
9 Frontenac	7,100	40	5,682	4	5,726	3,012	2,714	2,409	42
10 Glengarry	4,975	21	3,982	1	4,004	2,109	1,895	1,801	45
11 Grey	15,446	49	13,184	11	13,244	6,909	6,335	6,431	48
12 Haldimand	4,627	11	3,729	.....	3,740	1,956	1,784	2,363	63
13 Haliburton, N.E. Muskoka, S. Nipissing and E. Parry Sound	5,479	89	4,769	.....	4,858	2,513	2,345	2,310	47
14 Halton	4,430	2	3,341	.....	3,343	1,744	1,599	1,799	54
15 Hastings	12,645	32	8,570	3	8,805	4,496	4,309	4,365	49
16 Huron	14,293	9	10,556	1	10,566	5,531	5,035	6,023	57
17 Kent	9,823	36	8,064	1	8,101	4,223	3,878	4,103	50
18 Lambton	11,330	11	9,264	1	9,276	4,805	4,471	5,182	56
19 Lanark	5,811	7	4,431	4	4,442	2,277	2,165	2,489	56
20 Leeds and Grenville	10,442	43	8,947	4	8,994	4,593	4,401	4,691	52
21 Lennox and Addington	5,320	.....	4,258	1	4,259	2,207	2,052	2,184	51
22 Lincoln	4,092	31	3,675	.....	3,706	1,917	1,789	1,918	52
23 Middlesex	11,454	20	9,072	2	9,094	4,666	4,428	5,249	57
24 Norfolk	7,000	36	5,720	.....	5,756	2,922	2,834	2,817	49
25 Northumberland	7,308	12	5,800	1	5,813	3,026	2,787	3,054	52
26 Ontario	7,810	17	6,829	2	6,848	3,608	3,240	3,590	52
27 Oxford	8,698	6	6,927	9	6,942	3,590	3,352	3,758	54
28 Peel	5,162	6	3,934	.....	3,940	2,127	1,813	1,996	51
29 Perth	9,339	16	6,417	4	6,437	3,442	2,995	3,736	58
30 Peterborough	6,878	19	5,296	1	5,316	2,721	2,595	2,659	50
31 Prescott and Russell	13,040	31	5,371	4	5,406	2,784	2,622	2,577	48
32 Prince Edward	3,390	13	2,715	.....	2,728	1,391	1,337	1,396	51
33 Renfrew	12,075	19	7,562	6	7,587	3,889	3,698	3,271	43
34 Simcoe and W. Muskoka	18,140	16	15,315	3	15,364	8,118	7,246	7,739	50
35 Stormont	5,090	22	4,038	.....	4,060	2,084	1,976	2,001	49
36 Victoria and S. E. Muskoka	8,303	28	6,822	2	6,852	3,563	3,289	3,281	48
37 Waterloo	7,536	11	5,603	1	5,618	5,993	2,625	3,534	63
38 Welland	6,035	29	5,275	.....	5,304	2,689	2,615	2,756	52
39 Wellington	11,554	21	8,177	.....	8,198	4,376	3,822	4,624	56
40 Wentworth	6,045	.....	4,836	.....	4,836	2,568	2,268	2,621	54
41 York	13,618	35	11,652	1	11,688	6,132	5,556	6,250	53
42 Rainy River, Thunder Bay, Algoma and Manitoulin, etc.	10,171	46	8,055	10	8,111	4,117	3,994	4,136	51
43 N. Nipissing and W. Parry Sound	5,222	37	4,177	3	4,217	2,140	2,077	1,775	42
44 Moose Fort	50	.....	46	.....	46	16	30	19	41
Totals	360,637	985	279,153	98	280,236	145,618	134,618	145,608	52
Cities.									
1 Belleville	2,636	.....	1,368	.....	1,368	714	654	853	62
2 Brantford	3,402	.....	2,558	.....	2,558	1,287	1,271	1,874	73
3 Chatham	2,540	.....	1,515	.....	1,515	771	744	914	60
4 Guelph	3,394	.....	1,747	.....	1,747	853	894	1,289	74
5 Hamilton	14,080	.....	8,144	.....	8,144	4,101	4,043	6,106	75
6 Kingston	5,670	.....	2,445	.....	2,445	2,188	1,257	2,027	83
7 London	9,751	.....	5,612	.....	5,612	2,808	2,804	4,012	71
8 Ottawa	17,187	.....	5,013	.....	5,013	2,613	2,400	3,451	69
9 St. Catharines	3,035	.....	1,523	.....	1,523	742	781	1,006	66
10 St. Thomas	4,152	.....	1,967	.....	1,967	969	998	1,393	71
11 Stratford	2,688	.....	1,509	.....	1,509	785	724	1,066	71
12 Toronto	53,820	7	29,995	1	30,003	14,903	15,100	20,801	69
13 Windsor	3,974	.....	1,786	.....	1,786	914	872	1,209	68
14 Woodstock	1,700	.....	1,586	.....	1,586	793	793	1,105	70
Totals	128,029	7	66,768	1	66,776	33,441	33,335	47,106	73

THE PUBLIC SCHOOLS.—*Continued.*

I.—Table A.—School Population, Attendance, etc.—*Continued.*

Towns.	School population between 5 and 21 years of age.	Pupils under 5 years of age.	Pupils between 5 and 21 years of age.	Pupils over 21 years of age.	Total number of pupils attending school.	Boys.	Girls.	Average daily attendance of pupils.	Percentage of average to total attendance.
1 Alliston	600	.....	390	.....	390	196	194	214	55
2 Almonte	901	.....	391	.....	391	206	185	271	69
3 Amherstburg	607	.....	282	.....	282	159	123	193	69
4 Arnprior	976	.....	604	.....	604	282	322	431	71
5 Aurora	471	.....	341	.....	341	155	186	222	64
6 Aylmer	523	.....	419	.....	419	189	230	293	70
7 Barrie	1,634	.....	1,083	.....	1,083	530	553	626	58
8 Berlin	2,949	.....	1,487	.....	1,487	779	708	1,113	75
9 Blenheim	488	.....	396	.....	396	216	180	257	65
10 Bothwell	230	.....	220	.....	220	131	89	124	56
11 Bowmanville	978	.....	518	.....	518	258	260	339	65
12 Bracebridge	952	.....	721	.....	721	365	356	439	61
13 Brampton	850	.....	509	.....	509	267	242	387	76
14 Brockville	2,606	1	1,308	.....	1,309	632	677	911	70
15 Carleton Place	1,203	.....	853	.....	853	434	419	456	53
16 Clinton	515	.....	446	.....	446	229	217	316	71
17 Cobourg	1,117	.....	562	.....	562	271	291	385	68
18 Collingwood	1,858	.....	1,404	.....	1,404	695	709	937	67
19 Copper Cliff	565	.....	354	.....	354	159	195	211	60
20 Cornwall	1,902	.....	646	.....	646	331	315	475	73
21 Deseronto	1,004	2	651	.....	653	328	325	474	72
22 Dresden	577	.....	437	.....	437	200	237	268	61
23 Dundas	659	.....	527	.....	527	245	282	389	74
24 Dunnville	560	.....	410	.....	410	192	218	283	69
25 Durham	450	.....	437	3	440	212	228	270	60
26 Essex	375	.....	346	2	348	158	190	218	63
27 Forest	542	1	318	.....	319	145	174	218	68
28 Fort William	1,052	.....	625	.....	625	308	317	378	60
29 Galt	1,901	.....	1,364	.....	1,364	670	694	1,066	78
30 Gananoque	1,141	.....	755	.....	755	393	362	504	67
31 Goderich	961	.....	636	.....	636	296	340	457	72
32 Gore Bay	363	.....	275	3	278	129	149	139	50
33 Gravenhurst	851	.....	647	.....	647	338	309	360	56
34 Harriston	476	1	340	.....	341	182	159	235	69
35 Hawkesbury	1,229	.....	153	.....	153	84	69	91	59
36 Hespeler	686	.....	494	.....	494	239	255	312	63
37 Huntsville	632	.....	605	.....	605	317	288	330	55
38 Ingersoll	1,788	.....	740	.....	740	363	377	484	65
39 Kincardine	616	.....	383	.....	383	182	201	254	66
40 Kingsville	490	.....	421	.....	421	232	189	251	60
41 Leamington	730	.....	512	.....	512	249	263	337	66
42 Lindsay	1,800	.....	1,127	.....	1,127	559	568	794	70
43 Listowel	739	.....	592	.....	592	305	287	377	64
44 Little Current	270	.....	267	.....	267	120	147	162	61
45 Mattawa	458	.....	89	.....	89	52	37	50	56
46 Meaford	397	.....	390	.....	390	186	204	268	69
47 Midland	1,385	.....	985	.....	985	491	494	589	60
48 Milton	445	.....	377	.....	377	183	194	265	70
49 Mitchell	548	.....	397	.....	397	198	199	275	69
50 Mount Forest	554	.....	429	.....	429	244	185	302	70
51 Napanee	662	.....	563	.....	563	262	301	361	64
52 Newmarket	648	.....	443	.....	443	222	221	273	62
53 Niagara	221	.....	246	.....	246	128	118	132	54
54 Niagara Falls	1,156	.....	679	.....	679	363	316	499	73
55 North Bay	842	.....	504	.....	504	246	258	272	54
56 North Toronto	539	.....	548	.....	548	258	290	322	59
57 Oakville	482	.....	336	.....	336	171	165	204	61
58 Orangeville	975	.....	522	.....	522	234	288	352	67
59 Orillia	1,626	.....	957	.....	957	470	487	667	70
60 Oshawa	1,159	.....	789	.....	789	373	416	514	65
61 Owen Sound	2,275	.....	1,678	.....	1,678	818	860	1,098	65
62 Palmerston	597	.....	411	.....	411	210	201	264	64
63 Paris	897	.....	494	.....	494	250	244	348	70
64 Parkhill	378	.....	222	.....	222	113	109	157	71
65 Parry Sound	1,160	.....	879	1	880	424	456	459	52
66 Pembroke	1,527	.....	621	.....	621	326	295	393	63
67*Penetanguishene	830	.....	620	.....	620	327	293	361	58

* Including Protestant Separate School.

THE PUBLIC SCHOOLS.—*Continued.*

I.—Table A.—School Population, Attendance, etc.—*Concluded.*

Towns.	School population between 5 and 21 years of age.	Pupils under 5 years of age.	Pupils between 5 and 21 years of age.	Pupils over 21 years of age.	Total number of pupils attending school.	Boys.	Girls.	Average daily attendance of pupils.	Percentage of average to total attendance.
68 Perth	1,008	.....	524	.....	524	264	260	364	69
69 Peterborough	2,605	.....	1,605	.....	1,605	807	798	1,098	68
70 Petrolea	1,077	.....	816	.....	816	404	†12	497	61
71 Picton	776	.....	588	.....	588	331	257	373	63
72 Port Arthur	923	.....	625	.....	625	299	326	387	62
73 Port Hope	1,236	.....	854	.....	854	411	443	552	65
74 Prescott	813	.....	410	.....	410	197	213	287	70
75 Preston	619	.....	369	.....	369	190	179	246	67
76 Rat Portage	1,454	.....	853	.....	853	472	381	564	66
77 Renfrew	1,057	.....	405	.....	405	211	194	310	76
78 Ridgetown	602	3	460	.....	463	232	231	288	62
79 St. Mary's	900	.....	560	.....	560	298	262	377	67
80 Sandwich	449	.....	129	.....	129	66	63	56	43
81 Sarnia	2,126	.....	1,389	.....	1,389	632	757	1,021	74
82 Sault Ste. Marie	1,670	.....	1,372	.....	1,372	730	642	784	57
83 Seaforth	643	.....	268	.....	268	139	129	219	82
84 Simcoe	672	.....	463	.....	463	241	222	263	57
85 Smith's Falls	1,100	.....	1,110	.....	1,100	535	575	764	69
86 Stayner	376	.....	299	.....	209	142	157	202	67
87 Strathroy	750	.....	530	.....	530	255	275	368	69
88 Sturgeon Falls	661	.....	195	.....	195	93	102	136	70
89 Sudbury	567	.....	220	.....	220	111	109	119	54
90 Thessalon	570	.....	304	.....	304	148	156	156	51
91 Thornbury	285	.....	167	.....	167	92	76	118	71
92 Thorold	609	.....	303	.....	303	154	149	177	58
93 Tillsonburg	490	.....	457	.....	457	231	226	296	65
94 Toronto Junction	1,989	.....	1,507	.....	1,507	750	757	913	61
95 Trenton	1,187	.....	612	.....	612	298	314	410	67
96 Uxbridge	495	.....	383	.....	383	188	195	240	63
97 Vankleekhill	620	1	206	.....	207	117	90	137	66
98 Walkerton	772	.....	462	.....	462	229	233	321	69
99 Walkerville	500	.....	285	.....	285	161	124	165	58
100 Wallaceburg	926	.....	623	2	625	316	309	389	62
101 Waterloo	978	.....	635	.....	635	316	319	465	73
102 Welland	441	.....	314	.....	314	156	158	217	69
103 Whitby	717	.....	415	.....	415	214	201	258	62
104 Wiarton	773	.....	644	.....	644	335	309	388	60
105 Wingham	820	.....	556	.....	556	268	293	349	63
Totals	95,846	9	61,092	11	61,112	30,507	39,605	39,940	65
Totals.									
†1 Counties, etc	360,637	985	279,153	98	280,236	145,618	134,618	145,608	52
2 Cities	128,029	7	66,768	1	66,776	33,441	33,335	47,106	71
3 Towns	95,846	9	61,092	11	61,112	30,507	30,605	39,949	65
‡4 Grand totals 1902	584,512	1,001	407,013	110	408,124	209,566	198,558	232,663	57
5 " " 1901	574,490	1,070	413,449	100	414,619	214,222	200,397	235,084	57
6 Increases	10,022	.....	.....	10	.....	.....	.....	.....	.....
7 Decreases	.....	69	6,436	.....	6,495	4,656	1,839	2,421	.....
8 Percentages	.....	.25	99.72	.03	....	51.35	48.65	.57	.....

† In incorporated villages there were 29,290 pupils enrolled, with an average daily attendance of 18,265 (included in Counties, etc.)

‡ In addition, there were 11,300 Kindergarten pupils and 670 Night School pupils.

THE PUBLIC

II.—Table B.—Number of pupils in the

Counties (including incorporated villages, but not cities or towns), etc.	Reading. 1st Reader, Part I.	1st Reader, Part II.	2nd Reader.	3rd Reader.	4th Reader.	5th Reader.	Writing.	Arithmetic.	Drawing.
1 Brant	599	127	534	724	655	160	3,053	3,057	3,018
2 Bruce	2,414	1,713	1,901	2,035	2,057	509	10,329	10,580	10,082
3 Carlton	1,621	934	1,166	1,255	1,313	380	6,311	6,465	6,042
4 Dufferin	986	678	816	957	908	250	4,485	4,502	4,225
5 Dundas	978	730	994	604	864	274	4,354	4,426	4,166
6 Durham	850	651	974	981	934	238	4,628	4,528	4,628
7 Elgin	1,240	790	1,016	1,256	1,244	587	6,040	6,122	6,104
8 Essex	1,858	1,291	1,374	1,221	868	142	6,707	6,710	6,605
9 Frontenac	1,431	840	948	1,167	1,231	109	5,726	5,726	5,726
10 Glengarry	1,323	960	813	589	645	74	4,004	4,004	3,979
11 Grey	3,197	1,967	2,753	2,721	2,125	481	12,837	12,725	12,809
12 Haldimand	716	587	684	720	871	168	3,740	3,740	3,678
13 Haliburton, N. E. Muskoka, S. Nipissing and E. Parry Sound	1,447	810	904	912	585	200	4,348	4,567	4,391
14 Halton	697	489	563	680	739	215	3,342	3,343	3,343
15 Hastings	2,499	1,568	1,720	1,548	1,156	314	8,729	8,796	8,615
16 Huron	1,593	1,291	1,954	2,347	2,450	930	10,244	10,435	9,898
17 Kent	1,761	1,004	1,647	1,490	1,519	620	8,010	8,021	7,972
18 Lambton	2,287	1,871	1,466	1,852	1,678	422	9,156	9,202	8,575
19 Lanark	1,072	675	880	863	773	181	4,442	4,442	4,442
20 Leeds and Grenville	2,052	1,305	1,604	1,763	1,918	352	8,634	8,751	8,541
21 Lennox and Addington	932	699	785	856	868	188	4,244	4,269	4,244
22 Lincoln	828	475	584	812	929	80	3,302	3,341	3,192
23 Middlesex	1,582	1,291	1,663	1,907	2,032	619	9,094	9,094	9,094
24 Norfolk	1,242	818	1,135	1,082	1,237	242	5,515	5,661	5,384
25 Northumberland	1,118	804	1,184	1,300	1,159	248	5,650	5,699	5,392
26 Ontario	1,439	965	1,159	1,444	1,555	286	5,485	6,706	6,418
27 Oxford	1,300	1,054	1,210	1,360	1,493	525	6,794	6,884	6,248
28 Peel	789	584	647	878	856	186	3,940	3,940	3,788
29 Perth	1,113	895	1,150	1,099	1,333	250	6,263	6,384	5,984
30 Peterborough	1,372	807	1,020	997	951	169	5,113	5,214	4,927
31 Prescott and Russell	1,902	844	866	887	716	191	5,650	5,317	4,879
32 Prince Edward	458	353	440	502	764	211	2,699	2,723	2,705
33 Renfrew	2,189	1,441	1,377	1,270	1,142	268	7,039	7,278	6,493
34 Simcoe and West Muskoka	3,553	2,539	2,819	2,862	2,691	900	15,177	15,250	14,873
35 Stormont	1,025	551	939	881	785	169	4,060	4,060	3,968
36 Victoria and S.E. Muskoka	1,425	1,090	1,320	1,507	1,244	257	6,603	6,610	6,249
37 Waterloo	1,059	698	1,314	1,446	803	194	5,618	5,618	5,160
38 Welland	1,256	748	933	1,056	1,012	305	5,255	5,299	5,205
39 Wellington	1,631	1,154	1,503	1,749	1,729	432	8,022	8,134	7,951
40 Wentworth	937	639	794	1,151	1,045	260	4,795	4,834	4,772
41 York	2,769	1,782	2,206	2,403	2,267	267	11,268	11,414	11,166
42 Rainy River, Thunder Bay, Algoma, and Manitoulin, etc.	2,663	1,523	1,459	1,416	903	146	7,065	8,070	7,816
43 North Nipissing, West Parry Sound	1,442	723	754	707	654	82	3,589	3,845	3,337
44 Moose Fort	26	13	...	7	8	2	46	46	29
Totals	64,625	42,521	51,936	55,415	52,566	13,173	271,716	275,914	266,117
Cities.									
1 Belleville	351	247	214	229	345	...	1,368	1,368	1,368
2 Brantford	521	402	420	478	490	52	2,568	2,568	2,568
3 Chatham	316	181	310	321	384	...	1,515	1,515	1,515
4 Guelph	306	222	287	484	315	133	1,747	1,747	1,747
5 Hamilton	1,345	1,144	1,249	2,043	1,843	520	8,144	8,144	8,144
6 Kingston	184	310	336	662	753	...	2,445	2,445	1,445
7 London	946	810	1,381	1,258	1,192	...	5,612	5,612	5,612
8 Ottawa	1,033	611	787	1,234	1,222	126	5,013	5,013	5,013
9 St. Catharines	378	242	233	417	258	...	1,523	1,523	903
10 St. Thomas	...	247	379	435	395	...	1,967	1,967	1,967
11 Stratford	257	196	238	410	428	...	1,509	1,509	1,509
12 Toronto	5,713	3,712	6,760	6,592	5,679	1,547	30,003	30,003	30,003
13 Windsor	530	370	344	335	207	...	1,786	1,786	1,786
14 Woodstock	385	232	270	354	344	...	1,586	1,586	1,586
Totals	13,148	8,940	13,208	15,455	13,754	2,378	66,776	66,776	66,156

SCHOOLS.—*Continued.*

various branches of instruction.

	Geography.	Music.	Grammer and Composition.	English History.	Canadian History.	Physiology and Temperance.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.
1	2,282	1,830	2,178	846	1,337	1,051	1,694	161	157	143	26	28	614
2	6,943	4,890	6,760	2,752	4,339	4,915	4,138	482	571	537	213	221	1,515
3	4,335	2,350	4,320	1,860	2,613	1,985	2,587	350	355	341	172	46	829
4	3,155	2,411	2,608	1,769	1,999	2,063	2,931	187	249	235	96	108	772
5	3,509	2,776	3,187	1,129	1,620	1,548	2,619	249	252	248	21	106	826
6	3,014	1,841	2,668	812	1,081	993	1,282	184	214	207	42	71	213
7	4,578	3,016	4,381	1,965	2,936	3,276	3,922	579	553	532	209	196	1,555
8	3,952	2,758	3,342	1,403	2,649	4,322	2,792	152	120	98	44	44	704
9	3,981	2,143	3,141	1,572	2,215	1,954	3,037	106	97	87	32	7	830
10	2,553	1,642	2,337	841	1,093	1,184	1,692	71	70	70	69	45	383
11	9,295	6,598	8,158	2,843	5,154	7,983	6,950	449	476	429	341	84	1,576
12	2,680	2,148	2,700	1,125	1,370	1,436	2,504	213	159	151	40	34	1,090
13	2,785	1,454	2,581	1,026	1,586	1,335	1,672	175	173	157	15	51	293
14	2,390	1,326	2,197	1,069	1,518	1,238	1,664	166	187	184	84	110	686
15	5,254	4,409	4,862	1,593	2,932	4,873	5,396	614	290	283	71	46	956
16	7,818	5,549	7,136	3,342	4,964	3,698	3,847	824	900	794	263	268	1,808
17	5,953	5,108	5,452	2,475	3,140	3,443	4,306	580	609	609	105	110	2,024
18	5,733	5,390	5,836	2,209	3,803	5,956	6,078	388	395	380	244	103	1,752
19	2,766	1,235	2,528	1,011	1,456	1,634	1,699	175	164	125	108	50	288
20	6,044	4,650	5,844	2,499	3,488	3,540	4,243	307	307	300	109	60	1,492
21	2,921	1,546	2,720	1,289	1,727	1,776	2,255	214	176	170	40	57	1,112
22	2,761	2,072	2,333	1,302	1,646	1,623	1,943	76	63	48	142	90	577
23	8,090	6,377	7,445	2,793	3,899	4,757	5,656	600	577	571	59	32	2,232
24	4,031	3,169	3,715	1,840	2,047	1,849	2,805	315	214	208	61	7	1,416
25	4,301	1,880	3,851	1,266	1,685	1,752	2,165	248	226	220	75	67	580
26	4,552	2,777	4,094	2,119	2,686	2,267	3,232	278	270	256	59	25	1,030
27	4,553	2,277	4,296	2,373	2,783	2,818	2,585	438	510	478	186	195	1,284
28	2,839	1,524	2,541	1,453	1,825	1,450	2,442	189	189	189	8	24	484
29	4,671	5,196	4,104	1,652	2,984	1,652	5,341	237	222	222	42	28	1,730
30	3,702	1,803	3,269	1,166	1,715	1,858	2,507	161	159	145	79	77	218
31	3,044	1,772	2,875	914	1,481	1,436	3,099	198	187	171	193	21	1,337
32	2,240	915	2,042	1,042	1,168	1,539	1,066	198	187	181	213	52	566
33	3,773	1,541	3,458	1,562	2,064	2,112	1,724	260	243	242	31	50	550
34	9,731	7,930	9,153	4,645	5,676	5,479	10,364	1,066	865	858	356	331	2,190
35	2,860	1,433	2,473	968	1,128	1,344	1,715	155	163	153	62	62	343
36	4,698	2,860	4,339	1,647	2,430	1,829	2,671	147	223	202	166	52	545
37	3,645	3,625	3,280	750	1,821	1,286	2,598	149	154	150	93	14	707
38	3,552	2,568	3,252	1,595	2,183	1,885	1,630	331	297	270	160	3	545
39	5,640	4,052	5,119	2,313	3,680	2,875	3,752	403	403	392	180	101	1,218
40	3,274	2,040	3,086	1,369	2,083	1,452	2,222	270	242	218	184	154	1,121
41	8,073	6,639	7,770	2,660	4,050	3,280	5,981	306	238	271	35	177	975
42	4,364	3,136	3,795	1,663	2,163	3,158	3,619	163	130	98	32	7	567
43	2,108	631	1,850	702	1,010	872	1,489	83	72	71	64	9	190
44	.....	46	17	.....	15	.....	.....	.....	.....	.....	.....	.....	.....
	188,393	131,363	172,993	73,224	105,242	108,775	137,914	11,897	12,302	11,694	4,824	3,423	41,713
1	786	1,368	795	313	572	591	1,368	.....	.....	.....	.....	.....	.....
2	2,558	2,558	1,636	542	1,349	2,558	2,558	52	52	.....	.....	.....	.....
3	1,199	1,515	1,515	384	708	500	1,515	.....	.....	.....	.....	.....	.....
4	1,098	1,695	1,747	311	795	795	1,747	133	.....	.....	.....	.....	.....
5	5,980	8,077	6,799	2,527	2,989	4,440	8,144	520	481	457	1,721	53	.....
6	1,694	2,445	1,851	653	1,091	882	2,445	.....	.....	653	.....	.....	.....
7	5,612	5,612	2,439	913	2,016	5,612	5,612	.....	.....	.....	.....	.....	.....
8	2,582	3,665	2,582	737	1,348	2,582	5,013	126	126	126	.....	.....	.....
9	903	.....	903	258	444	444	.....	.....	.....	.....	.....	.....	.....
10	1,207	.....	1,207	395	828	1,207	1,207	.....	.....	.....	.....	.....	.....
11	1,132	499	1,076	414	638	1,076	1,509	.....	.....	.....	.....	.....	.....
12	29,796	30,003	28,922	4,488	7,519	17,951	29,266	2,863	526	526	92	.....	1,344
13	906	1,304	994	207	542	1,786	1,601	.....	.....	.....	.....	.....	.....
14	1,129	1,586	699	345	699	969	.....	.....	.....	.....	.....	.....	.....
	56,582	60,327	53,165	12,517	21,538	41,393	61,985	3,694	1,185	1,814	1,813	53	1,344

THE PUBLIC

II.—Table B.—Number of pupils in

Towns.	Reading.								
	1st Reader, Part I.	1st Reader, Part II.	2nd Reader.	3rd Reader.	4th Reader.	5th Reader.	Writing.	Arithmetic.	Drawing.
1 Alliston	73	63	68	56	68	62	390	388	390
2 Almonte	77	67	104	67	76		391	391	391
3 Amherstburg	73	43	66	33	43	24	282	282	282
4 Arnprior	177	120	111	82	111		604	605	604
5 Aurora	73	54	71	81	62		341	341	341
6 Aylmer	56	64	89	98	112		419	419	419
7 Barrie	206	149	273	225	215	15	1,083	1,083	1,083
8 Berlin	226	283	413	359	206		1,487	1,487	1,487
9 Blenheim	63	83	122	59	25	44	396	396	396
10 Bothwell	49	22	33	34	40	42	220	220	210
11 Bowmanville	97	70	124	103	124		518	518	518
12 Bracebridge	163	195	154	83	72	54	686	721	686
13 Brampton	108	81	76	140	104		509	509	509
14 Brockville	203	164	272	289	281		1,309	1,309	1,309
15 Carleton Place	240	160	154	129	169	1	583	853	853
16 Clinton	90	70	81	122	83		446	446	446
17 Cobourg	76	93	121	166	106		562	562	562
18 Collingwood	401	212	268	232	291		1,404	1,404	1,404
19 Copper Cliff	147	60	76	29	29	13	354	354	350
20 Cornwall	184	93	167	114	88		646	646	646
21 Deseronto	226	115	134	115	63		653	653	653
22 Dresden	131	73	62	77	36	58	437	437	437
23 Dundas	172	105	62	124	124		527	527	527
24 Dunnville	105	61	80	87	77		410	410	410
25 Durham	98	71	68	57	70	76	440	336	384
26 Essex	111	61	66	55	55		348	348	348
27 Forest	81	61	61	45	71		319	319	319
28 Fort William	193	117	90	78	147		625	625	625
29 Galt	310	142	283	323	306		1,364	1,364	1,364
30 Gananoque	198	109	140	175	133		755	755	755
31 Goderich	92	91	116	201	136		636	636	636
32 Gore Bay	52	27	56	57	46	40	278	278	262
33 Gravenhurst	207	142	112	88	98		647	647	508
34 Harriston	63	35	73	85	85		341	341	341
35 Hawkesbury	46	16	32	34	25		153	153	153
36 Hespeler	115	63	119	120	51	26	494	494	494
37 Huntsville	178	96	125	88	77	41	544	605	516
38 Ingersoll	137	52	189	204	158		740	740	740
39 Kincardine	61	53	66	89	114		383	383	383
40 Kingsville	92	84	89	87	40	33	421	421	421
41 Leamington	122	92	113	97	88		512	512	512
42 Lindsay	225	141	255	296	210		1,127	1,057	1,127
43 Listowel	130	86	96	162	130		592	592	592
44 Little Current	84	39	53	28	53	13	267	267	267
45 Mattawa	18	28	5	12	17	9	89	89	89
46 Meaford	87	108	79	60	56		390	390	390
47 Midland	337	147	220	128	98	55	985	985	985
48 Milton	87	47	61	45	70	67	377	377	356
49 Mitchell	61	61	56	109	110		397	397	397
50 Mount Forest	87	54	98	92	98		429	429	429
51 Napanee	120	67	90	115	171		563	563	563
52 Newmarket	108	89	110	74	62		443	443	443
53 Niagara	46	20	50	53	77		246	246	246
54 Niagara Falls	187	73	91	202	126		679	679	492
55 North Bay	196	82	78	77	70		504	504	504
56 North Toronto	192	77	95	93	74	17	548	548	470
57 Oakville	79	58	61	85	53		336	336	336
58 Orangeville	117	100	98	98	109		522	522	522
59 Orillia	204	136	200	171	187	59	957	957	957
60 Oshawa	191	116	127	215	140		789	789	789
61 Owen Sound	400	201	375	345	357		1,678	1,678	1,678
62 Palmerston	102	55	70	67	84	33	411	411	411
63 Paris	102	89	78	139	86		494	494	494

SCHOOLS —*Continued.*

various branches of instruction.—*Continued.*

	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Physiology and Temperance.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.
1	390	390	388	244	244	244	390	46	83	82	46	82	.....
2	282	.....	253	76	104	76	137	.....	.....	.....	.....	.....	.....
3	209	229	264	67	100	258	205	24	24	24	24	15	.....
4	307	411	604	111	169	604	604	.....	.....	.....	.....	.....	.....
5	341	279	341	62	124	214	279	.....	.....	.....	.....	.....	.....
6	299	209	299	78	112	112	.....	.....	.....	.....	.....	.....	.....
7	1,004	1,083	972	455	455	670	1,083	608	15	15	.....	.....	.....
8	978	1,487	978	94	206	206	1,487	.....	.....	.....	.....	.....	.....
9	268	396	172	69	118	172	.....	44	44	44	44	44	.....
10	139	130	220	72	90	90	130	32	42	42	32	42	.....
11	351	518	391	124	227	351	518	.....	.....	.....	.....	.....	.....
12	617	667	427	126	209	72	667	19	54	54	19	20	.....
13	509	509	509	153	214	198	509	.....	.....	.....	.....	.....	.....
14	1,309	1,309	1,309	285	444	1,309	1,309	.....	.....	.....	.....	.....	.....
15	574	444	540	170	235	170	170	.....	.....	.....	.....	.....	105
16	356	446	205	61	356	60	446	.....	.....	.....	.....	.....	.....
17	393	307	382	106	272	216	142	.....	.....	.....	.....	.....	.....
18	944	1,186	521	417	521	1,136	1,404	.....	.....	.....	.....	.....	.....
19	354	354	147	71	38	38	354	9	13	13	.....	13	38
20	462	646	365	88	143	143	646	.....	.....	.....	.....	.....	.....
21	312	566	312	63	178	178	563	.....	.....	.....	.....	.....	.....
22	284	317	284	85	171	113	.....	58	58	58	58	58	.....
23	298	527	298	124	236	351	527	.....	.....	.....	.....	.....	.....
24	365	322	205	59	98	98	269	.....	.....	.....	.....	.....	.....
25	286	155	267	100	167	195	140	20	76	76	20	72	.....
26	196	76	136	55	110	348	.....	.....	.....	.....	.....	.....	.....
27	177	273	264	71	116	116	248	.....	.....	.....	.....	.....	.....
28	401	541	625	147	225	225	576	.....	.....	.....	.....	.....	.....
29	1,161	1,364	937	200	525	1,364	569	.....	.....	.....	.....	.....	.....
30	557	397	448	133	306	308	755	.....	.....	.....	.....	.....	.....
31	453	636	453	136	337	136	636	.....	.....	.....	.....	.....	.....
32	163	.....	179	70	94	46	.....	24	40	40	.....	20	.....
33	298	308	370	98	186	298	72	.....	.....	.....	.....	.....	.....
34	278	.....	278	86	170	218	281	.....	.....	.....	.....	.....	.....
35	153	153	153	25	59	59	.....	.....	.....	.....	.....	.....	.....
36	316	.....	197	77	197	197	.....	26	26	26	.....	.....	26
37	382	.....	272	114	133	287	.....	37	41	41	37	4	.....
38	740	740	740	158	285	740	740	.....	.....	.....	.....	.....	.....
39	322	283	322	114	203	203	383	.....	.....	.....	.....	.....	.....
40	249	371	355	73	167	268	421	33	33	33	33	.....	.....
41	313	.....	298	88	185	512	.....	.....	.....	.....	.....	.....	.....
42	740	884	906	210	329	553	471	.....	.....	.....	.....	.....	.....
43	382	592	383	130	292	201	592	.....	.....	.....	.....	.....	.....
44	186	267	186	66	94	81	235	13	13	13	13	13	.....
45	89	54	43	35	38	35	.....	9	9	9	.....	.....	9
46	390	390	390	56	149	390	390	.....	.....	.....	.....	.....	.....
47	985	930	985	193	281	449	900	55	50	50	55	.....	.....
48	366	377	243	126	155	327	377	56	67	67	.....	24	58
49	275	236	275	110	219	110	275	.....	.....	.....	.....	.....	.....
50	342	429	342	98	190	278	429	.....	.....	.....	.....	.....	.....
51	563	408	308	171	226	226	376	.....	.....	.....	.....	.....	.....
52	443	443	443	62	136	136	443	.....	.....	.....	.....	.....	.....
53	170	53	200	77	111	170	116	.....	.....	.....	.....	.....	.....
54	492	679	429	126	328	328	.....	.....	.....	.....	.....	.....	.....
55	504	504	504	70	147	147	504	.....	.....	.....	.....	.....	.....
56	339	548	470	91	158	88	374	17	17	17	17	.....	.....
57	212	239	178	50	94	122	239	.....	.....	.....	.....	.....	.....
58	405	522	252	109	207	252	522	.....	.....	.....	.....	.....	.....
59	657	689	633	227	376	364	267	59	18	18	.....	.....	.....
60	484	404	484	86	140	140	168	.....	.....	.....	.....	.....	.....
61	1,077	1,678	887	357	702	702	1,678	.....	.....	.....	.....	.....	.....
62	309	294	309	184	184	221	378	33	33	33	33	33	.....
63	494	.....	225	86	179	494	.....	.....	.....	.....	.....	.....	.....

THE PUBLIC

II.—Table B.—Number of pupils in the

Reading.

Towns.	1st Reader, Part I.	1st Reader, Part II.	2nd Reader.	3rd Reader.	4th Reader.	5th Reader.	Writing.	Arithmatic.	Drawing.
64 Parkhill	46	38	39	18	51	.....	222	222	222
65 Parry Sound	299	143	132	127	117	62	880	880	880
66 Pembroke	150	91	108	89	173	.....	621	621	621
*67 Penetanguishene	225	137	98	77	48	35	620	620	620
68 Perth	108	68	115	110	123	.....	524	524	524
69 Peterborough	370	275	319	311	330	.....	1,605	1,605	1,605
70 Petrolea	234	156	126	172	128	.....	816	816	816
71 Picton	167	75	117	115	114	.....	588	588	588
72 Port Arthur	225	107	69	136	88	.....	625	625	625
73 Port Hope	209	141	172	165	167	.....	854	854	504
74 Prescott	95	106	68	48	103	.....	410	410	410
75 Preston	55	77	91	90	56	.....	369	369	369
76 Rat Portage	256	163	163	147	94	.....	853	853	853
77 Renfrew	108	26	79	79	113	.....	405	405	405
78 Ridgetown	115	58	101	83	106	.....	463	463	463
79 St. Mary's	106	70	82	159	143	.....	560	560	497
80 Sandwich	47	44	21	21	25	1	129	129	129
81 Sarnia	111	248	270	181	279	.....	1,385	1,389	1,389
82 Sault Ste. Marie	505	235	246	228	188	.....	1,372	1,372	1,372
83 Seaforth	64	42	39	45	81	.....	268	268	268
84 Simcoe	96	48	131	60	128	.....	463	463	463
85 Smith's Falls	348	139	214	209	200	.....	1,110	1,110	1,110
86 Stayner	84	40	40	41	57	37	262	299	272
87 Strathroy	115	82	110	105	118	.....	530	530	530
88 Sturgeon Falls	45	39	26	42	33	10	195	195	195
89 Sudbury	57	41	29	37	37	19	220	220	220
90 Thessalon	100	54	40	46	53	11	304	304	304
91 Thornbury	32	26	32	44	22	11	167	167	167
92 Thorold	71	55	46	67	64	.....	303	303	303
93 Tillsonburg	74	60	98	98	127	.....	457	457	457
94 Toronto Junction	251	248	264	243	311	.....	1,506	1,507	1,507
95 Trenton	142	117	142	119	75	.....	612	612	612
96 Uxbridge	69	67	93	87	67	.....	383	383	383
97 Vankleekhill	73	21	23	42	48	.....	207	207	207
98 Walkerton	105	68	69	93	127	.....	462	462	462
99 Walkerville	70	51	64	58	48	14	285	285	285
100 Wallaceburg	261	106	95	73	88	152	564	615	564
101 Waterloo	106	78	117	136	118	.....	577	526	526
102 Welland	60	62	52	72	68	.....	314	314	314
103 Whitby	97	57	79	84	118	.....	415	415	415
104 Wiarton	163	142	144	117	78	.....	644	644	644
105 Wingham	111	63	104	114	70	94	556	556	194
Totals	15,268	9,592	11,879	11,871	11,325	1,178	60,860	60,919	59,805

Totals.

1 Counties, etc	64,625	42,521	51,936	55,415	52,566	13,173	271,716	275,914	266,117
2 Cities	13,048	8,950	13,208	15,438	13,754	2,378	66,776	66,776	66,156
3 Towns	15,268	9,591	11,879	11,871	11,325	1,178	60,860	60,919	59,805
4 Grand totals, 1902	92,941	61,062	77,023	82,724	77,645	16,729	399,352	403,609	392,078
5 " " 1901	94,560	61,869	78,555	84,615	78,544	16,476	407,080	408,035	399,050
6 Increases						253			
7 Decreases	1,619	807	1,532	1,891	899	.....	7,728	4,426	6,972
8 Percentages	22.77	14.96	18.87	20.27	19.03	4.1	98	99	96

* Including Protestant Separate Schools.

SCHOOLS.—*Continued.*

various branches of instruction.—*Concluded.*

	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Physiology and Temperance.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.
64	138	222	99	51	99	99	.....	.....	.....	.....	.....	.....	.....
65	535	522	535	221	306	232	562	62	62	62	62	62	.....
66	621	621	621	173	262	262	621	.....	.....	.....	.....	.....	.....
67	324	437	620	83	159	69	261	24	21	24	14	.....	.....
68	318	524	233	123	172	123	524	.....	.....	.....	.....	.....	.....
69	938	502	960	225	641	641	845	.....	.....	.....	.....	.....	.....
70	442	.....	624	122	310	425	816	.....	.....	.....	.....	.....	.....
71	500	588	588	229	229	588	588	.....	.....	.....	.....	.....	.....
72	332	149	254	88	187	187	73	.....	.....	.....	.....	.....	.....
73	504	.....	504	167	251	332	.....	.....	.....	.....	.....	.....	.....
74	410	410	410	151	151	151	410	.....	.....	.....	.....	.....	.....
75	237	369	237	56	120	95	.....	.....	.....	.....	.....	.....	.....
76	434	776	241	94	241	853	776	.....	.....	.....	.....	.....	.....
77	271	405	271	113	192	192	405	.....	.....	.....	.....	.....	.....
78	463	398	290	189	189	189	398	.....	.....	.....	.....	.....	.....
79	384	58	405	143	302	143	113	.....	.....	.....	.....	.....	.....
80	68	.....	68	33	33	27	.....	1	1	1	1	.....	.....
81	789	1,218	1,199	336	460	954	1,389	5	.....	.....	.....	.....	.....
82	764	816	634	188	383	388	1,161	.....	.....	.....	.....	.....	.....
83	165	268	207	81	126	81	268	.....	.....	.....	.....	.....	.....
84	367	463	188	128	143	188	463	.....	.....	.....	.....	.....	.....
85	1,110	1,110	1,110	200	283	1,110	1,110	.....	.....	.....	.....	.....	.....
86	142	149	299	76	66	141	149	10	37	37	10	37	.....
87	335	530	333	72	223	530	530	.....	.....	.....	.....	.....	.....
88	150	110	111	43	85	75	195	10	30	10	10	.....	.....
89	119	.....	163	29	93	37	127	19	17	17	16	.....	.....
90	150	304	150	64	64	64	.....	11	11	11	.....	.....	11
91	167	167	167	33	116	167	167	11	11	11	.....	2	11
92	252	.....	270	61	131	159	.....	.....	.....	.....	.....	.....	.....
93	383	457	457	225	173	225	457	.....	.....	.....	.....	.....	.....
94	861	1,507	861	311	554	355	1,507	.....	.....	.....	.....	.....	.....
95	346	388	463	75	194	194	504	.....	.....	.....	.....	.....	.....
96	314	383	314	67	108	108	383	.....	.....	.....	.....	.....	.....
97	113	117	207	90	90	90	207	.....	.....	.....	.....	.....	.....
98	289	162	291	127	220	289	462	.....	.....	.....	.....	.....	.....
99	285	285	285	62	100	201	285	14	14	12	12	.....	.....
100	591	170	467	229	229	217	.....	41	102	102	41	41	.....
101	391	55	391	118	183	118	.....	.....	.....	.....	.....	.....	.....
102	254	.....	254	68	140	192	.....	.....	.....	.....	.....	.....	.....
103	415	415	415	141	202	415	415	.....	.....	.....	.....	.....	.....
104	339	644	339	78	195	195	321	.....	.....	.....	.....	.....	.....
105	320	462	382	102	170	70	.....	70	94	94	70	94	.....
	43,992	45,107	42,605	12,997	21,857	29,604	42,216	1,500	1,138	1,136	661	676	238
	188,593	131,363	172,993	73,224	105,242	108,775	137,914	11,897	12,302	11,694	4,824	3,423	41,718
	56,582	60,327	53,165	12,517	21,538	41,393	61,985	3,694	1,185	1,814	1,813	53	1,344
	43,992	45,107	42,605	12,996	21,857	29,604	42,216	1,500	1,138	1,136	661	676	238
	288,967	236,797	268,763	98,738	148,637	179,772	242,115	17,091	14,625	14,644	7,298	4,152	43,295
	295,389	238,365	371,915	98,602	150,830	184,100	245,094	19,310	14,337	13,608	6,649	3,976	46,267
	.....	.....	.....	136	.....	.....	.....	.....	288	1,036	649	176	.....
	6,422	1,568	3,152	.....	2,163	328	2,979	2,219	.....	.....	.....	.....	2,972
	71	58	66	24	36	44	59	4	3	3	2	1	10

THE PUBLIC

III.—Table C.—Teachers

	Counties. (including incorporated villages, but not cities or towns) etc.	Number of Teachers.	Male.	Female.	Salaries. Highest salary paid.	Average salary, male teacher.	Average salary, female teacher.
					$	$	$
1	Brant	70	17	53	575	432	310
2	Bruce	222	83	139	800	380	275
3	Carleton	137	31	106	600	390	289
4	Dufferin	105	23	82	700	328	281
5	Dundas	109	46	63	800	340	265
6	Durham	117	26	91	550	380	278
7	Elgin	132	42	90	520	415	269
8	Essex	122	48	74	500	382	314
9	Frontenac	153	31	122	475	280	233
10	Glengarry	85	16	69	550	333	257
11	Grey	249	74	175	650	379	272
12	Haldimand	94	23	71	650	390	283
13	Haliburton N.E. Muskoka, S. Nipissing and E. Parry Sound	133	17	116	600	358	209
14	Halton	76	21	55	600	383	298
15	Hastings	205	48	157	800	367	272
16	Huron	222	85	137	800	366	283
17	Kent	148	39	109	700	438	306
18	Lambton	201	52	149	575	373	290
19	Lanark	131	16	115	600	307	240
20	Leeds and Grenville	261	57	204	600	306	248
21	Lennox and Addington	126	26	100	600	313	241
22	Lincoln	83	26	57	600	410	273
23	Middlesex	208	79	129	525	372	286
24	Norfolk	121	39	82	600	346	275
25	Northumberland	127	43	84	660	384	271
26	Ontario	138	46	92	600	377	281
27	Oxford	141	67	74	675	418	296
28	Peel	89	30	59	600	380	293
29	Perth	120	51	69	530	383	294
30	Peterborough	117	41	76	650	340	259
31	Prescott and Russell	114	30	84	850	342	234
32	Prince Edward	81	28	53	500	324	271
33	Renfrew	158	29	129	550	312	243
34	Simcoe and W. Muskoka	304	116	188	750	379	274
35	Stormont	89	22	67	475	313	256
36	Victoria and S. E. Muskoka	168	55	113	550	339	247
37	Waterloo	117	47	70	650	431	294
38	Welland	106	27	79	720	397	280
39	Wellington	169	64	105	700	383	305
40	Wentworth	97	32	65	550	400	295
41	York	214	83	131	700	404	306
42	Rainy River, Thunder Bay, Algoma and Manitoulin, etc.	182	72	110	950	366	254
43	N. Nipissing and W. Parry Sound	152	14	138	500	311	241
*1	Totals, Counties, etc	6,193	1,862	4,331	950	372	271
2	" Cities	1,234	159	1,075	1,600	935	479
3	" Towns	1,070	179	891	1,100	667	317
†4	Grand totals, 1902	8,497	2,200	6,297	1,600	436	313
5	" 1901	8,403	2,353	6,050	1,550	421	306
6	Increases	94		247	50	15	7
7	Decreases		153				
8	Percentages		25.89	74.11			

* There were 535 teachers in incorporated Villages (included in Counties, etc.)
† In addition there were 247 Kindergarten teachers and 17 Night School teachers.

SCHOOLS.—*Continued.*

Salaries, Certificates, etc.

	Number of teachers who have attended Normal School or Normal College.	Number of University graduates.	Certificates.						
			Provincial 1st class.	Provincial 2nd class.	First class, old County Board.	Second class, old County Board.	Third class.	Temporary.	Other certificates.
1	49	.....	7	43	.....	.....	20	.....	.....
2	91	5	17	76	1	.....	127	.....	1
3	91	.....	14	77	.....	.....	37	9	.....
4	34	2	5	29	.....	.....	71	.....	.....
5	42	.....	4	38	1	.....	66	.....	.....
6	70	2	5	56	.....	1	55	.....	.....
7	59	.....	10	56	.....	.....	64	2	.....
8	49	2	2	48	.....	.....	67	5	.....
9	36	6	2	33	.....	1	77	40	.....
10	29	.....	4	25	.....	.....	47	9	.....
11	111	.....	11	96	.....	6	134	1	1
12	47	1	7	41	.....	.....	46	.....	.....
13	5	.....	5	15	.....	.....	89	24	.....
14	42	1	4	38	.....	.....	34	.....	.....
15	69	.....	7	61	.....	.....	133	4	.....
16	123	.....	8	127	.....	.....	87	.....	.....
17	69	.....	2	66	.....	.....	80	.....	.....
18	110	1	6	103	.....	.....	91	1	.....
19	23	3	.....	27	1	.....	100	3	.....
20	84	2	8	78	.....	.....	174	1	.....
21	31	4	4	27	1	.....	86	8	.....
22	42	3	5	36	2	.....	39	.....	1
23	112	.....	5	108	.....	2	92	1	.....
24	48	.....	4	46	.....	2	67	2	.....
25	73	1	3	72	.....	1	50	.....	1
26	67	.....	2	65	.....	.....	69	2	.....
27	78	2	9	70	1	.....	61	.....	.....
28	53	.....	4	49	.....	.....	36	.....	.....
29	69	.....	6	63	.....	.....	51	.....	.....
30	45	.....	2	42	.....	2	50	19	2
31	20	.....	1	21	.....	.....	51	2	39
32	25	1	3	22	.....	.....	51	5	.....
33	16	2	2	17	.....	.....	103	36	.....
34	92	2	11	86	.....	2	203	2	.....
35	24	.....	2	23	.....	1	57	6	.....
36	51	1	2	50	1	.....	94	18	3
37	75	.....	6	70	.....	.....	41	.....	.....
38	40	1	5	34	4	.....	63	.....	.....
39	92	.....	11	84	.....	.....	73	1	.....
40	60	.....	12	47	.....	.....	38	.....	.....
41	150	1	9	144	.....	.....	61	.....	.....
42	37	.....	8	56	.....	.....	58	56	5
43	9	.....	2	27	.....	.....	72	49	2
1	2,540	43	246	2,392	12	18	3,165	305	55
2	1,179	24	218	976	10	7	19	.....	4
3	882	14	131	768	12	4	135	6	14
4	4,601	81	595	4,136	34	29	3,319	311	73
5	4,427	.....	601	3,983	46	24	3,448	270	31
6	174	.....	.....	153	.....	5	.....	41	42
7	.....	.....	6	.....	12	.....	129	.....	.....
8	54	1	7	46.68	.....	.....	39	3.66	.....

THE PUBLIC

IV.—Table D.—School

Totals	School Houses.					School Visits.				
	Number of Schools open.	Brick.	Stone.	Frame.	Log.	By Inspector.	By Trustees.	By Clergymen.	By other persons.	Total.
1 Counties, etc	5,279	2,230	435	2,294	320	10,827	7,579	3,502	23,571	45,479
2 Cities	167	146	17	4	.....	3,589	2,524	528	12,645	19,286
3 Towns	225	157	27	41	.....	2,012	2,251	491	2,814	7,568
4 Grand totals, 1902	5,671	2,533	479	2,339	320	16,378	12,354	4,521	39,030	72,283
5 " 1901	5,663	2,522	477	2,342	322	16,078	12,520	4,431	38,802	71,831
6 Increases	8	11	2	.....	.....	300	.....	90	228	452
7 Decreases	.....	.....	.....	3	2	.....	166	.....	.....	.....
8 Percentages	.....	44.67	8.45	41.21	5.64	22.66	17.09	6.25	54	.....

SCHOOLS.—*Continued.*

Houses, Prayers, etc.

	Maps and Globes.		Examinations. Prizes.		Lectures.			Trees.					
	Number of maps.	Number of globes.	Number of public examinations.	Number of schools distributing prizes or merit cards.	By Inspector.	By other persons.	Total.	Number of trees planted on Arbor Day.	Number of schools using authorized Scripture Readings.	Number of schools opened or closed with prayer.	Number of schools using the Bible.	Number of schools imparting religious instruction.
1	42,953	4,601	2,203	413	1,167	183	1,350	10,171	3,114	5,106	2,172	879
2	6,857	272	103	112	9	17	26	*	56	167	142	.....
3	2,693	322	63	27	56	58	114	162	103	219	123	11
4	52,503	5,195	2,369	552	1,232	258	1,490	10,333	3,273	5,492	2,437	890
5	53,403	5,137	2,449	553	1,250	244	1,494	9,926	3,263	5,474	2,405	882
6	.....	58	.....	.....	.....	14	.....	407	10	18	32	8
7	900	.....	80	1	18	.....	4	.....	.....	.....	.....	.....
8	†9.25	†.92	.....	9.73	82.07	17.93	.....	.....	57.71	96.84	42.97	15.69

* 14,270 plants.

† To each school.

THE PUBLIC

V.—Table E.—

Counties (including incorporated villages, but not cities or towns), etc.	Receipts. Legislative grants.	Municipal grants and assessments.	Clergy Reserve fund, balances and other sources.	Total Receipts for all Public School purposes.
	$ c.	$ c.	$ c.	$ c.
1 Brant	2,332 00	27,276 39	18,486 57	48,094 96
2 Bruce	8,180 25	79,331 68	39,219 16	126,731 09
3 Carleton	4,631 25	52,015 44	14,253 85	70,900 54
4 Dufferin	3,289 00	40,979 24	15,074 79	59,343 03
5 Dundas	3,353 50	39,411 86	11,219 35	53,984 71
6 Durham	3,380 00	42,484 42	15,957 34	61,821 76
7 Elgin	4,664 75	51,651 66	31,142 99	87,459 40
8 Essex	4,948 82	49,567 79	23,041 95	77,558 56
9 Frontenac	3,940 00	38,710 24	15,409 38	58,059 62
10 Glengarry	2,610 25	27,550 45	10,346 31	40,507 01
11 Grey	8,260 00	93,842 33	36,016 68	138,119 01
12 Haldimand	3,053 00	34,431 36	14,751 47	52,235 83
13 Halibu rton, N. E. Muskoka. S. Nipissing and E. Parry Sound	11,161 50	29,057 64	12,089 48	52,308 62
14 Halton	2,530 50	24,141 15	16,387 38	43,059 03
15 Hastings	7,594 50	62,978 15	29,371 49	99,944 14
16 Huron	8,179 25	83,991 14	41,654 27	133,824 66
17 Kent	6,213 25	59,355 77	47,778 55	113,347 57
18 Lambton	6,456 00	73,523 95	38,675 66	118,655 61
19 Lanark	4,153 00	36,785 50	13,430 68	54,369 18
20 Leeds and Grenville	6,882 00	76,657 82	28,083 03	111,622 85
21 Lennox and Addington	3,705 50	33,424 95	15,970 63	53,101 08
22 Lincoln	2,796 00	33,041 23	16,493 07	52,330 30
23 Middlesex	7,221,50	78,897 80	39 004 54	125,123 84
24 Norfolk	4,012 50	38,647 54	28,044 45	70,704 49
25 Northumberland	4,328 80	47,106 83	18,687 36	70,122 99
26 Ontario	5,261 50	53,184 05	20 440 63	78,886 18
27 Oxford	5,021 50	58,344 78	40,390 14	103,756 42
28 Peel	2,826 50	34,111 52	16,447 87	53,385 89
29 Perth	4,489 25	51,287 87	22,639 18	78,416 30
30 Peterborough	4,196 65	38,640 59	15,226 50	58,063 74
31 Prescott and Russell	4,109 75	36,769 92	12,032 73	52,912 40
32 Prince Edward	2,151 00	25,283 28	9,378 69	36,812 97
33 Renfrew	6,258 00	42,460 80	16,905 24	65,624 04
34 Simcoe and W. Muskoka	16,618 75	102,846 07	53,417 98	172,882 80
35 Stormont	2,767 25	27,730 03	8,617 71	39,114 99
36 Victoria and S. E. Muskoka	9,096 25	49,432 37	21,208 71	79,737 33
37 Waterloo	4,075 75	50,000 59	41,242 73	95,319 07
38 Welland	3,513 25	37,699 48	22,945 80	64,158 53
39 Wellington	6,014 00	67,349 71	40,128 10	113,491 81
40 Wentworth	3,620 75	37,965 74	24,000 47	65,586 96
41 York	7,210 25	91,957 17	42,807 95	141,975 37
42 Rainy River, Thunder Bay, Algoma and Manitoulin, etc	21,873 61	65,622 50	29,965 00	117,461 11
43 N. Nipissing and W. Parry Sound	11,897 00	25,612 50	9,965 91	47,475 41
44 Moose Fort	150 00			150 00
Totals	249,028 13	2,151,161 30	1,038,351 77	3,438,541 20
Cities.				
1 Belleville	1,061 00	11,238 45	1,434 83	13,734 28
2 Brantford	2,135 25	27,500 00	2,866 54	32,501 79
3 Chatham	1,218 85	15,549 78	430 86	17,199 49
4 Guelph	1,309 30	17,298 32	1,201 46	19,809 08
5 Hamilton	6,861 65	107,091 94	45,105 27	159,058 86
6 Kingston	2,241 60	27,630 00	1,874 14	31,745 74
7 London	5,167 80	89,485 77	2,512 91	97,166 48
8 Ottawa	4,255 35	88,975 00	36,717 81	129,948 16
9 St. Catharines	1,210 00	14,260 06	162 23	15,632 29
10 St. Thomas	1,646 00	20,278 92	860 48	22,785 40
11 Stratford	1,711 40	16,000 00	1,714 86	19,426 26
12 Toronto	27,082 85	533,523 00	31,798 92	592,404 77
13 Windsor	1,622 00	22,550 00	1,166 84	25,338 84
14 Woodstock	1,441 56	13,733 44	1,991 16	17,166 16
Totals	58,964 61	1,005,114 68	129,838 31	1,193,917 60

SCHOOLS.—*Continued.*

Financial Statement.

	Expenditure.					
	Teachers' salaries.	Sites and building school houses.	Libraries, maps, apparatus, prizes and school books.	Rent and repairs, fuel, and other expenses.	Total expenditure for all Public School purposes.	Balances.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	23,747 07	489 31	214 82	7,701 35	32,152 55	15,942 41
2	70,353 94	8,781 34	1,108 75	20,026 90	100,270 93	26,460 16
3	43,119 87	4,089 01	770 91	12,099 62	60,079 41	10,821 13
4	31,277 35	3,249 45	561 53	12,951 45	48,039 78	11,303 25
5	31,895 31	4,784 11	1,883 90	8,776 40	47,339 72	6,644 99
6	34,980 09	2,173 77	965 24	9,165 58	47,284 68	14,537 08
7	41,842 65	3,478 44	606 48	16,215 12	62,142 69	25,316 71
8	41,028 75	2,027 61	1,544 77	14,570 35	59,171 48	18,387 08
9	34,156 45	2,545 86	775 03	8,318 09	45,795 43	12,264 19
10	22,985 03	2,994 79	304 67	6,505 04	32,790 53	7,716 48
11	74,536 57	12,647 77	1,580 76	24,816 70	113,531 80	24,587 21
12	28,813 36	1,395 79	297 45	7,142 64	37,649 24	14,586 59
13	30,048 24	5,609 81	934 57		45,006 95	7,301 67
14	24,116 78	1,200 73	272 64	9,411 70	35,001 85	8,057 18
15	56,627 57	6,146 48	1,293 70	14,598 47	78,666 22	21,277 92
16	70,778 45	9,543 63	1,040 98	23,917 82	105,280 88	28,543 78
17	50,138 75	6,121 07	1,904 51	17,532 55	75,696 88	37,650 69
18	62,184 57	9,293 60	2,101 28	18,975 56	92,555 01	26,100 60
19	32,400 78	1,722 81	1,241 24	8,085 73	43,459 56	19,909 62
20	66,963 58	4,354 81	1,491 26	17,490 23	90,299 88	21,322 97
21	31,639 64	1,006 46	510 13	8,000 49	41,156 72	11,944 36
22	26,619 15	2,494 61	403 84	8,534 21	38,051 81	14,278 49
23	65,926 82	3,457 10	805 43	21,951 99	92,141 34	32,982 50
24	36,290 47	1,188 10	203 82	9,021 39	46,703 78	24,000 71
25	39,156 93	1,776 26	1,808 02	10,713 20	53,454 41	16,668 58
26	43,690 42	2,553 76	876 71	15,066 24	62,187 13	16,699 05
27	49,373 68	2,911 03	1,519 96	14,917 32	67,721 99	36,034 43
28	28,701 38	3,811 63	361 46	9,249 85	42,224 32	11,161 57
29	40,034 84	5,738 55	683 49	11,497 70	60,954 58	17,461 72
30	33,333 29	6,590 49	316 60	8,951 72	49,192 10	8,871 64
31	30,114 49	4,113 07	437 24	7,441 94	42,106 74	10,805 66
32	23,236 80	451 50	102 25	4,466 77	28,257 32	8,555 65
33	39,942 27	5,798 29	578 40	9,803 34	56,122 30	9,501 74
34	93,616 99	12,226 16	2,710 22	23,998 22	132,551 59	40,331 21
35	23,614 47	5,565 48	148 10	5,131 26	34,459 31	4,655 68
36	45,817 89	6,725 73	653 73	13,162 81	66,260 16	13,477 17
37	40,790 87	2,825 48	935 03	11,681 98	56,233 36	39,085 71
38	32,678 71	1,517 44	658 28	9,369 29	44,223 72	19,934 81
39	55,697 25	10,755 12	1,224 53	18,601 43	86,278 33	27,213 48
40	32,200 84	1,482 03	733 62	10,070 44	44,486 93	21,100 03
41	71,413 93	5,951 40	1,953 43	25,238 80	104,557 56	37,417 81
42	51,111 00	19,860 00	1,852 00	21,302 00	94,455 00	23,006 11
43	25,791 62	5 763 66	1,252 07	8,408 78	41,216 13	6,259 28
44	140 00	.....	10 00	.....	150 00	.....
	1,833,267 91	207,213 54	41,582 85	555,297 80	2,637,362 10	801,179 10
1	9,477 20	.....	12 00	3,157 21	12,646 41	1,087 87
2	21,002 67	180 21	1,419 27	9,899 64	32,501 79	.....
3	11,033 39	.....	.....	6,166 10	17,199 49	.....
4	13,776 14	.....	156 06	4,146 44	18,078 64	1,730 44
5	73,620 29	26,550 87	5,695 47	37,141 82	142,988 45	16,070 11
6	20,590 03	.....	1,931 64	8,987 95	31,509 62	236 12
7	66,381 38	6,861 95	.....	22,591 33	95,834 66	1,331 82
8	57,991 27	20,321 74	3,276 97	32,974 17	114,564 15	15,384 01
9	12,742 39	.....	.....	1,971 61	14,714 00	918 29
10	16,019 87	.....	36 35	6,216 76	22,272 98	512 42
11	12,118 82	.....	1,222 39	5,019 92	18,361 13	1,065 13
12	402,127 27	29,743 35	17,063 71	131,263 22	580,197 55	12,207 22
13	16,020 34	.....	96 17	9,222 33	25,338 84	.....
14	12,022 50	.....	1,110 27	3,607 12	16,739 89	426 27
	744,922 56	83,638 12	32,020 30	282,365 62	1,142,947 60	50,970 00

THE PUBLIC

V.—Table E.—

Receipts.

Towns.	Legislative grants.	Municipal grants and assessments.	Clergy Reserve fund, balances and other sources.	Total receipts for all Public School purposes.
	$ c.	$ c.	$ c.	$ c.
1 Alliston	368 00	2,200 00	313 28	2,881 28
2 Almonte	270 00	3,863 81	890 01	5,025 82
3 Amherstburg	229 00	1,765 00	1,400 25	3,394 25
4 Arnprior	293 00	3,518 12	1,892 97	5,704 09
5 Aurora	179 00	2,375 00	641 24	3,195 24
6 Aylmer	296 55	4,572 62	166 85	5,036 02
7 Barrie	774 00	9,303 49	414 86	10,492 35
8 Berlin	1,219 20	14,487 44	5,876 07	21,582 71
9 Buenheim	304 00	3,997 30	185 49	4,486 79
10 Bothwell	202 00	1,619 57	271 26	2,092 83
11 Bowmanville	333 00	4,600 00	23 00	4,956 00
12 Bracebridge	982 00	3,373 51	2,923 22	7,278 73
13 Brantford	493 00	4,700 00	767 70	5,960 70
14 Brockville	1,026 00	13,900 00	551 63	15,477 63
15 Carleton Place	497 00	5,200 00	119 09	5,816 09
16 Clinton	447 00	2,900 00	505 74	3,852 74
17 Cobourg	400 85	6,240 00	135 19	6,776 04
18 Collingwood	718 00	14,969 27	718 80	16,406 07
19 Copper Cliff	331 00	4,702 42	4,014 72	9,048 14
20 Cornwall	456 00	7,261 75	2,463 53	10,181 28
21 Deseronto	457 00	4,054 64	1,302 87	5,814 51
22 Dresden	284 00	2,816 00	5,277 69	8,377 69
23 Dundas	338 00	5,100 00	139 68	5,577 68
24 Dunnville	261 00	2,600 00	50 33	2,911 33
25 Durham	521 00	2,539 78	1,003 40	4,064 18
26 Essex	172 00	2,186 77	67 61	2,426 38
27 Forest	343 00	2,549 75	347 07	3,239 82
28 Fort William	411 00	7,189 00	1,700 00	9,600 00
29 Galt	1,089 90	15,500 00	410 10	17,000 00
30 Gananoque	604 00	5,427 11	273 74	6,304 85
31 Goderich	588 00	5,406 85	247 40	6,242 25
32 Gore Bay	510 00	927 00	481 90	1,918 90
33 Gravenhurst	259 00	3,650 00	177 67	4,086 67
34 Harriston	204 00	2,604 00	143 31	2,951 31
35 Hawkesbury	50 00	1,600 00	104 71	1,754 71
36 Hespeler	364 70	3,557 87	361 20	4,283 77
37 Huntsville	473 00	3,027 00	249 76	3,749 76
38 Ingersoll	682 35	5,960 00	586 56	7,228 91
39 Kincardine	415 00	4,250 00	474 58	5,139 58
40 Kingsville	272 00	3,001 12	2,570 01	5,843 13
41 Leamington	291 00	3,878 00	407 64	4,576 64
42 Lindsay	798 00	10,456 93	104 12	11,359 05
43 Listowel	317 00	3,583 00	176 32	4,876 32
44 Little Current	143 00	1,100 00	1,170 07	2,413 07
45 Mattawa	55 00	1,294 45	75 23	1,424 68
46 Meaford	381 00	3,250 00	79 06	3,710 06
47 Midland	470 00	5,158 85	338 00	5,966 85
48 Milton	511 00	2,269 00	1,213 66	3,993 66
49 Mitchell	388 00	2,627 00	309 65	3,324 65
50 Mount Forest	401 00	3,364 00	232 77	4,097 77
51 Napanee	498 00	4,150 00	978 94	5,626 94
52 Newmarket	389 00	3,350 00	462 12	4,201 12
53 Niagara	150 07	1,877 78	129 22	2,157 00
54 Niagara Falls	519 30	6,400 00	1,400 00	8,319 30
55 North Bay	204 00	4,382 10	213 37	4,799 47
56 North Toronto	248 00	4,619 27	32 35	4,899 62
57 Oakville	187 00	3,458 75	854 25	4,500 00
58 Orangeville	650 00	3,550 00	464 04	4,664 04
59 Orillia	479 00	2,300 00	6,784 43	9,563 43
60 Oshawa	468 00	5,800 00	622 26	6,890 26
61 Owen Sound	1,238 85	14,467 00	257 50	15,963 35
62 Palmerston	318 00	2,928 65	46 48	3,293 13
63 Paris	348 00	4,800 00	16 00	5,164 00
64 Parkhill	139 00	500 00	1,364 93	2,003 93
65 Parry Sound	1,057 00	4,160 50	890 96	6,108 46
66 Pembroke	379 00	5,065 61	354 52	5,799 13
67* Penetanguishene	347 00	3,609 32	464 92	4,421 24

* Including Protestant Separate School

SCHOOLS.—*Continued.*

Financial Statement.—*Continued.*

		Expenditure.				
	Teachers' salaries.	Sites, and building school houses.	Libraries, maps, apparatus, prizes and school books.	Rent and repairs, fuel and other expenses.	Total expenditure for all Public School purposes.	Balances
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	2,038 25			379 14	2,417 39	463 89
2	3,964 46			1,059 36	5,023 82	
3	2,432 14	9 87	179 89	772 35	3,391 25	
4	3,267 91			929 05	4,196 96	1,507 13
5	1,983 36		60	447 77	2,431 73	763 51
6	3,155 52	669 89	20 76	1,189 85	5,036 02	
7	8,149 50		32 00	2,082 86	10,264 36	227 99
8	11,396 00	5,747 93	362 71	3,376 19	20,882 83	699 88
9	2,789 53	353 63	11 00	693 18	3,847 34	639 45
10	1,677 84		43 80	156 22	1,877 86	214 97
11	3,999 50	59 06	27 05	735 29	4,820 90	135 10
12	3,822 27	933 81	377 34	1,724 42	6,857 84	420 89
13	3,562 28	300 00	519 87	1,335 69	5,717 84	242 86
14	9,573 75		384 24	4,299 54	14,257 53	1,220 10
15	4,543 50		16 50	1,001 01	5,561 01	255 08
16	2,922 00			489 24	3,411 24	441 50
17	4,407 75		81 27	2,287 02	6,776 04	
18	7,777 75	4,701 80		3,724 75	16,204 30	201 77
19	2,595 97	512 28	712 82	4,848 27	8,669 34	378 80
20	4,801 92			1,881 64	6,683 56	3,497 72
21	4,615 78	50		1,011 85	5,628 13	186 38
22	2,689 81	1 15	2 75	5,392 82	8,086 53	291 16
23	4,142 10		9 00	1,331 84	5,482 94	94 74
24	2,194 08			466 28	2,660 36	250 97
25	2,714 74		28 43	742 89	3,486 06	578 12
26	1,856 95		6 00	552 50	2,415 45	10 93
27	2,405 00			497 42	2,902 42	337 40
28	4,735 99	51 50		3,942 91	8,730 40	569 60
29	11,323 88	3,415 02	65 55	2,192 08	16,996 53	3 47
30	4,370 99			917 63	5,288 62	1,016 23
31	5,256 07			986 18	6,242 25	
32	1,467 50			417 34	1,884 84	31 06
33	2,937 94	280 20		761 75	3,979 89	106 78
34	2,031 00	85 00	5 65	666 12	2,787 77	163 54
35	1,157 50			388 05	1,545 55	209 16
36	3,023 66	183 47	217 91	858 73	4,283 77	
37	2,821 92	85 20	48 00	674 16	3,629 28	120 48
38	5,395 50		263 76	1,210 84	6,870 10	358 81
39	3,056 12		38 34	1,472 99	4,567 45	572 13
40	2,425 00	609 60		2,682 41	5,717 01	126 12
41	3,095 88		16 50	982 90	4 095 28	481 36
42	8,620 27			2,394 45	11,014 72	344 33
43	2,977 69			1,019 91	3,997 60	78 72
44	1,162 60			795 93	1,958 53	454 54
45	845 52		11 45	506 47	1,363 44	61 24
46	2,656 62			983 65	3,640 27	69 79
47	4,446 85	25 25	397 94	980 79	5,850 83	116 02
48	2,797 37	371 00	316 17	443 83	3,928 37	65 29
49	2,814 50	17 64	39 73	336 35	3,208 22	116 43
50	3,066 26			1,014 60	4,080 86	16 91
51	4,149 70		24 34	1,442 89	5,616 93	10 01
52	2,475 00		8 00	941 10	3,424 10	777 02
53	1,580 00		30 00	379 83	1,939 83	167 17
54	5,063 00	1,674 78	107 01	1,382 03	8,226 82	92 48
55	2,938 74	884 18		956 49	4,879 41	20 06
56	3,301 67	975 79	140 80	438 30	4,856 56	43 06
57	1,865 00		50 00	2,585 00	4,500 00	
58	3,738 62		27 93	800 83	4,567 38	96 66
59	6,790 63		244 45	1,625 56	8,660 64	902 79
60	4,879 92		193 55	1,816 79	6,890 26	
61	11,422 50	651 29	101 10	3,622 17	15,797 06	166 29
62	2,516 10		5 88	689 32	3,211 30	81 83
63	3,716 52		38 75	1,082 38	4,832 65	331 35
64	1,657 12			263 03	1,920 15	83 78
65	4,255 25	560 00	27 25	1,256 49	6,098 99	9 47
66	3,809 54	1,131 90		857 69	5,799 13	
67	3,181 71	258 50		567 85	4,008 06	413 18

THE PUBLIC

V.—TABLE E.—

Receipts.

Towns.—*Con.*	Legislative grants.	Municipal grants and assessments.	Clergy Reserve fund, balances and other sources.	Total receipts for all Public School purposes.
	$ c.	$ c.	$ c.	$ c.
68 Perth	462 00	4,593 43	255 60	5,311 03
69 Peterborough	1,098 76	18,000 00	1,337 11	20,435 81
70 Petrolea	523 00	7,000 00	378 54	7,901 54
71 Picton	556 00	4,850 00	3,030 07	8,436 07
72 Port Arthur	245 00	5,383 44	1,730 37	7,358 81
73 Port Hope	649 00	6,500 00	441 50	7,590 50
74 Prescott	426 00	3,233 52	312 24	3,971 76
75 Preston	257 50	3,336 70	1,617 82	5,212 02
76 Rat Portage	494 00	8,976 24	194 37	9,664 61
77 Renfrew	381 00	4,760 24	653 92	5,795 16
78 Ridgetown	304 00	3,715 19	40 03	4,059 22
79 St. Marys	424 00	4,000 00	280 09	4,704 09
80 Sandwich	57 00	1,700 00	1,332 30	3,089 30
81 Sarnia	976 00	12,532 86	109 18	13,618 04
82 Sault ste. Marie	862 00	15,949 52	224 24	17,035 76
83 Seaforth	226 00	2,600 00	846 65	3,672 65
84 Simcoe	542 35	3,977 23	667 29	5,186 87
85 Smith's Falls	661 00	7,005 10	834 09	8,500 19
86 Stayner	347 00	2,053 00	242 70	2,642 70
87 Strathroy	522 00	4,200 00	414 31	5,136 31
88 Sturgeon Falls	75 00	1,900 00	1,704 46	3,679 46
89 Sudbury	160 00	1,499 92	1,118 71	2,778 63
90 Thessalon	189 00	1,481 00	153 72	1,823 72
91 Thornbury	107 00	1,866 12	330 22	2,303 34
92 Thorold	183 00	2,530 00	443 60	3,156 60
93 Tillsonburg	277 50	3,709 75	93 15	4,080 40
94 Toronto Junction	1,054 25	17,970 00	1,645 74	20,669 99
95 Trenton	399 00	4,401 26	1,028 02	5,828 28
96 Uxbridge	193 00	2,810 84	.....	3,003 84
97 Vankleekhill	285 00	2,890 00	8,169 51	11,344 51
98 Walkerton	400 00	3,749 56	288 85	4,438 41
99 Walkerville	219 00	4,300 00	3 46	4,522 46
100 Wallaceburg	491 00	3,865 00	538 38	4,894 38
101 Waterloo	395 65	5,553 32	489 91	6,438 88
102 Welland	231 00	3,400 00	1,992 81	5,623 81
103 Whitby	392 00	4,250 00	160 43	4,802 43
104 Wiarton	279 00	3,902 51	112 91	4,294 42
105 Wingham	366 00	3,845 46	147 65	4,359 11
Totals	45,201 65	510,287 61	93,051 25	648,540 51

Totals.

1 Counties, etc.	219,028 13	2,151,161 39	1,038,351 77	3,438,541 29
2 Cities	58,964 61	1,005,114 68	129 838 31	1,193,917 60
3 Towns	45 201 65	510,287 61	93,051 25	648,540 51
4 Grand Totals, 1902	353,194 39	3,666,563 59	1,261,241 33	5,280,999 31
5 " " 1901	348,510 70	3,522,660 98	1,322,163 47	5,193,335 15
6 Increases	4,683 69	143,902 61	.....	87,664 16
7 Decreases	.....	.....	60,922 14	.....
8 Percentages	0 69	69.43	23.88	.....

Cost per pupil : Counties, etc., $9.41 : Cities, $17.12 : Towns, $9.97 : Province, $10.75.

SCHOOLS.—*Concluded.*

Financial Statement.—*Concluded.*

	Expenditure.					Balances
	Teachers' salaries.	Sites, and building school houses.	Libraries, maps, apparatus, prizes and school books.	Rent and repairs, fuel, and other expenses.	Total expenditure for all Public School purposes.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
68	3,810 49	.....	.....	887 67	4,698 16	612 87
69	13,913 50	.....	25 00	6,497 31	20,435 81	.....
70	5,442 00	.....	.....	2,211 49	7,653 49	248 05
71	3,901 12	.....	160 17	1,235 37	5,296 66	3,139 41
72	3,494 61	1,769 82	18 51	1,294 70	6,577 64	781 17
73	5,761 66	.....	21 50	1,807 34	7,590 50	.....
74	3,041 52	.....	29 20	876 81	3,947 53	24 23
75	2,563 36	.....	55 10	718 81	3,337 27	1,874 75
76	6,752 45	145 75	.....	2,566 56	9,464 76	199 85
77	3,670 78	550 00	11 85	1,112 30	5,344 93	450 23
78	2,831 25	92 80	13 50	782 61	3,720 16	339 06
79	3,250 58	.....	6 00	979 67	4,236 25	467 84
80	850 50	108 34	14 15	702 82	1,675 81	1,413 49
81	8,988 40	666 59	152 89	2,478 07	12,282 95	1,335 09
82	7,569 00	.....	.....	9,013 89	16,582 89	452 87
83	2,213 50	.....	6 00	437 64	2,657 14	1,015 51
84	4,056 00	2 38	66 15	1,061 54	5,186 07	80
85	5,624 00	472 72	378 78	1,701 19	8,176 69	323 50
86	2,020 80	9 30	14 36	249 27	2,293 73	348 97
87	3,901 24	.....	.....	987 27	4,888 51	247 80
88	1,119 63	231 00	158 37	2,170 46	3,679 46	.....
89	1,795 00	.....	.....	567 11	2,362 11	415 52
90	1,445 96	.....	162 46	215 30	1,823 72	.....
91	1,243 06	.....	.....	842 41	2,085 47	217 87
92	2,175 00	.....	4 00	559 33	2,738 33	418 27
93	2,730 34	.....	47 50	1,151 96	3,929 80	150 60
94	11,394 50	1,780 23	15 00	7,011 91	20,201 64	468 35
95	3,921 90	543 62	60 00	702 40	5,227 92	600 36
96	2,657 65	.....	15 50	330 69	3,003 84	.....
97	1,783 36	9,036 72	.....	430 43	11,250 51	94 00
98	3,514 50	.....	.....	707 61	4,222 11	216 30
99	2,913 03	.....	141 99	1,271 71	4,326 73	195 73
100	3,631 50	.....	62 89	1,164 99	4,859 38	35 00
101	4,607 84	.....	47 40	1,708 91	6,364 15	74 73
102	2,088 13	1,030 91	6 00	1,029 50	4,154 54	1,469 27
103	3,825 00	.....	19 38	869 61	3,713 99	88 44
104	2,565 00	.....	.....	1,706 27	4,271 27	23 15
105	3,368 94	.....	17 58	926 07	4,312 59	46 52
	409,741 41	40,990 42	6,962 32	151,715 26	609,409 41	39,131 10
1	1,833,267 91	207,213 54	41,582 85	555,297 80	2,637,362 10	801,179 10
2	744,923 56	83,638 13	32,020 30	282,365 62	1,142,947 60	50,970 00
3	409,741 41	40,990 42	6,962 32	151,715 26	609,409 41	39,131 10
4	2,987,932 89	331,842 08	80,565 47	989,378 68	4,389,719 11	891,280 20
5	2,874,472 87	433,800 79	74,829 81	945,578 16	4,328,681 63	864,653 52
6	113,460 01	.....	5,735 66	43,800 52	61,037 48	26,626 68
7	.....	101,958 71	.....	.....	.....	.....
8	68.07	7.56	1.83	22.54	.....	.....

ROMAN CATHOLIC

I.—Table F.—Financial

Counties (exceeding incorporated villages but not cities or towns,) etc.	Number of schools.	Receipts. Legislative grants.	School rate or supporters.	Balances, subscribed and from other sources.	Total amount received.	Expenditure. Teachers' salaries.
		$ c.	$ c.	$ c.	$ c.	$ c.
1 Bruce	7	447 00	4,832 71	2,832 71	8,112 42	3,643 22
2 Carleton	16	992 00	6,945 78	5,043 19	12,980 97	5,438 25
3 Essex	23	754 71	9,866 13	8,071 71	18,692 58	9,392 95
4 Frontenac	12	468 00	3,264 06	2,564 47	6,296 53	2,836 50
Grey	7	319 00	1,967 21	781 30	3,067 51	1,705 00
Hastings	7	252 00	1,489 94	491 82	2,233 76	1,710 00
7 Huron	8	330 00	3,354 14	1,298 96	4,983 10	2,737 00
8 Kent	8	345 00	3,269 24	1,963 41	5,576 65	2,838 42
9 Lambton	2	75 00	541 22	243 04	859 26	500 00
10 Lanark	3	128 00	646 17	294 51	1,068 68	665 00
11 Leeds and Grenville	5	322 00	1,363 49	397 36	2,082 85	1,405 00
12 Lennox and Addington	2	109 00	521 40	379 64	1,010 04	510 00
13 Lincoln	2	87 00	968 83	406 92	1,462 75	702 00
14 Middlesex	6	201 00	1,784 75	438 19	2,423 94	1,530 00
15 Norfolk	1	37 00	316 88	275 59	629 47	320 00
16 Northumberland	6	281 00	1,916 49	942 16	3,139 65	1,633 50
17 Ontario	1	84 00	176 39	765 23	1,025 62	685 63
18 Peel	1	56 00	130 00	21 00	207 00	186 00
19 Perth	4	171 00	1,361 38	608 37	2,140 75	1,060 00
20 Peterborough	1	40 00	241 41	65 78	347 19	225 00
21 Prescott and Russell	69	2,737 00	24,598 17	11,589 35	38,924 52	19,997 50
22 Renfrew	12	1,161 00	3,658 15	4,682 52	9,501 67	3,791 00
23 Simcoe	3	269 50	1,325 69	283 11	1,878 30	1,178 00
24 Stormont, Dundas and Glengarry	11	748 00	6,099 29	5,287 97	12,139 26	5,502 16
25 Waterloo	7	548 00	3,519 38	1,858 09	5,695 47	2,800 00
26 Wellington	8	307 00	3,376 06	928 92	4,611 98	2,235 36
27 Wentworth	1	59 00	125 00	97 15	281 15	200 00
28 York	2	48 00	517 60	311 40	877 00	495 00
29 Algoma Dist., etc	3	250 00	1,082 44	277 50	1,609 94	950 00
30 Nipissing Dist	16	1,400 00	3,200 43	1,626 63	6,227 06	3,498 71
Totals	254	14,796 21	92,459 83	54,828 00	160,084 07	80,371 20
Cities						
1 Belleville	4	268 00	1,233 89	1,232 64	2,734 53	1,809 15
2 Brantford	2	243 00	1,727 93	937 77	2,908 70	1,100 00
3 Chatham	1	184 00	1,845 31	5,244 81	7,274 12	1,100 00
4 Guelph	3	265 00	3,004 34	249 11	3,518 45	2,325 00
5 Hamilton	8	1,079 00	11,446 01	2,344 87	14,869 88	6,267 50
6 Kingston	3	477 00	4,560 67	2,826 27	7,863 94	3,790 48
7 London	6	664 00	7,499 45	122 88	8,286 33	3,166 57
8 Ottawa	23	3,936 00	41,725 00	13,665 40	59,326 40	23,222 50
9 St. Catharines	3	246 00	4,093 67	48 96	4,388 63	1,998 32
10 St. Thomas	1	157 0	1,500 00	64 88	1,721 88	1,000 00
11 Stratford	1	216 00	2,286 96	1,138 34	3,638 30	1,300 00
12 Toronto	22	3,404 00	52,983 24	28,528 37	84,915 61	27,705 34
13 Windsor	2	320 00	4,286 00	1,121 49	6,027 49	5,291 63
14 Woodstock	1	62 44	437 56	3,875 00	4,375 00	675 00
Totals	80	11,521 44	138,627 03	61,700 79	211,849 26	80,751 50

SEPARATE SCHOOLS.

Statement Teachers, etc.

	ture.					Teachers.				
	Sites and building school houses.	Maps, apparatus, prizes and libraries.	All other purposes.	Total amount expended.	Balances.	Number of teachers.	Male.	Female.	Average salary, male.	Average salary, female. (In addition, members of Religious Orders received free residence.)
	$ c.	$ c.	$ c.	$ c.	$ c.				$	$
1	1,228 55	12 58	1,417 07	6,301 42	1,810 00	16	4	12	392	185
2	4,865 75	221 41	1,488 18	12,013 59	967 38	27	.....	27	.....	213
3	3,245 61	216 83	4,161 65	17,017 04	1,675 54	32	8	24	384	248
4	1,118 16	212 97	1,030 50	5,198 13	1,098 40	12	2	10	230	244
5	.....	.....	565 45	2,270 45	797 06	7	.....	7	....	243
6	30 98	15 98	241 65	1,998 61	235 15	7	1	6	225	248
7	5 70	2 25	1,232 53	3,977 48	1,005 62	9	2	7	350	291
8	353 48	60 97	1,083 36	4,336 23	1,241 42	11	1	10	337	259
9	.....	37 50	77 50	615 00	244 26	2	.....	2	.....	250
10	.....	2 75	42 50	710 25	358 43	3	.....	3	.....	222
11	158 00	56 25	366 54	1,985 79	97 06	8	.....	8	.....	185
12	359 36	14 82	54 07	938 25	71 79	2	.....	2	.....	255
13	358 00	37 85	308 22	1,406 07	56 68	4	.....	4	.....	200
14	9 05	.....	610 36	2,149 41	274 53	6	1	5	240	258
15	.....	4 28	71 65	395 93	233 54	1	.....	1	.....	320
16	320 36	89 57	751 72	2,795 15	344 50	7	.....	7	.....	240
17	.....	.....	139 63	825 26	200 36	2	1	1	450	235
18	.....	.....	21 00	207 00	.....	1	.....	1	.....	220
19	243 00	.....	419 95	1,722 95	417 80	4	.....	4	.....	265
20	.....	.....	97 69	322 69	24 50	1	.....	1	.....	225
21	5,912 05	360 37	3,654 68	29,924 60	8,999 92	86	9	77	276	224
22	2,285 34	58 05	822 64	6,957 03	2,544 64	15	.....	15	.....	230
23	185 12	18 39	236 43	1,617 94	260 36	5	1	4	400	192
24	2,017 20	.....	3,886 75	11,406 11	729 15	22	1	21	425	221
25	335 97	32 20	482 99	3,651 16	2,044 31	12	2	10	312	217
26	545 27	.....	988 33	3,768 96	843 02	10	1	9	250	224
27	34 25	5 00	41 90	281,15	.....	1	.....	1	.....	200
28	.....	.....	161 87	656 87	220 13	2	1	1	275	220
29	304 94	51 02	204 18	1,510 14	99 80	3	.....	3	.....	317
30	1,134 46	190 25	1,337 94	6,161 36	65 70	17	3	14	298	227
	25,050 60	1,701 29	25,998 93	133,122 02	26,962 05	335	38	297	327	229
1	46 10	14 50	718 72	2,588 47	146 06	6	1	5	600	208
2	1,246 57	45 35	352 92	2,644 84	263 86	5	.....	5	.....	220
3	5,177 40	222 20	416 02	6,915 62	358 50	6	.....	6	.....	200
4	.....	59 50	874 12	3,258 62	259 83	8	.....	8	.....	237
5	2,940 90	974 38	3,356 34	13,539 12	1,330 76	37	.....	37	.....	175
6	1,787 20	81 63	868 86	6,528 17	1,335 77	13	1	12	700	229
7	1,845 60	250 00	2,575 76	7,838 03	448 30	19	.....	19	.....	200
8	12,006 34	320 00	22,597 45	58,146 29	1,180 11	103	18	85	401	210
9	1,230 00	15 00	1,132 94	4,376 26	12 37	9	1	8	550	180
10	.....	25 00	660 50	1,685 50	36 38	5	.....	5	.....	200
11	954 27	19 50	1,309 90	3,583 67	54 63	6	.....	6	.....	217
12	21,557 00	1,793 48	29,185 51	80,241 33	4,674 28	101	26	75	300	200
13	.....	.....	735 86	6,027 49	.....	13	.....	13	.....	413
14	3,500 00	100 00	100 00	4,375 00	.....	2	.....	2	.....	337
	52,291 38	3,920 54	64,784 90	201,748 41	10,1 0 85	333	47	286	359	213

ROMAN CATHOLIC

I.—Table F.—Financial

Towns.	No. of schools.	Receipts. Legislative grants.	School rate on supporters.	Balances subscribed and from other sources.	Total amount received	Expenditure. Teachers' salaries.
		$ c.	$ c.	$ c.	$ c.	$ c.
1 Almonte	1	101 00	1,048 86	2,094 46	3,244 32	885 00
2 Amherstburg	1	230 00	1,569 15	1,098 49	2,897 64	1,224 00
2 Arnprior	2	175 00	2,051 51	734 49	2,961 00	1,500 00
4 Barrie	1	115 00	1,470 05	855 41	2,440 46	900 00
5 Berlin	1	275 00	2,642 56	3,587 74	6,505 30	1,755 00
6 Brockville	1	357 00	2,381 56	83 75	2,822 31	1,825 00
7 Cobourg	1	149 00	1,000 00	55 69	1,204 69	850 00
8 Cornwall	3	456 00	4,300 00	1,197 99	5,953 99	3,643 94
9 Dundas	1	76 00	850 05	648 64	1,574 69	600 00
10 Fort William	1	89 00	739 75	13,092 53	13,921 28	900 00
11 Galt	1	64 00	545 38	25 00	634 38	325 00
12 Goderich	1	57 00	450 00	75 58	582 58	400 00
13 Hawkesbury	1	209 00	2,450 00		2,659 00	1,820 00
14 Ingersoll	1	70 00	833 02	65 64	968 66	575 00
15 Lindsay	2	198 00	2,143 64	1,127 72	3,469 36	2,084 55
16 Mattawa	1	203 00	3,202 80	799 26	4,205 06	1,144 86
17 Newmarket	1	37 00	261 92	125 00	423 92	290 00
18 Niagara Falls	1	94 00	812 15	100 04	1,006 19	600 00
19 North Bay	2	101 00	1,756 00	27 27	1,884 27	1,262 89
20 Oakville	1	21 00	200 00	100 00	321 00	250 00
21 Orillia	1	115 00	1,879 61	1,336 97	3,331 58	1,398 50
22 Oshawa	1	57 00	414 02	320 51	791 53	418 00
23 Owen Sound	1	72 00	986 06	735 30	1,793 36	500 00
24 Paris	1	51 00	510 91	568 32	1,130 23	400 00
25 Parkhill	1	32 00	306 02		338 02	300 00
26 Pembroke	1	247 00	2,850 60	580 54	3,678 14	2,538 17
27 Perth	1	132 00	1,001 00	614 25	1,747 25	800 00
28 Peterborough	3	439 00	1,918 60	138 11	5,495 71	4,233 15
29 Picton	1	37 00	450 00	502 21	989 21	420 00
30 Port Arthur	1	142 00	1,087 71	720 14	1,949 85	780 00
31 Prescott	1	129 00	1,073 45	378 78	1,581,23	1,101 48
32 Preston	1	49 00	501 88	808 52	1,359 40	350 00
33 Rat Portage	2	142 00	1,300 00	1,419 38	2,861 38	1,263 00
34 Renfrew	2	168 00	1,635 74	1,140 84	2,944 58	1,213 90
35 St. Mary's	1	37 00	496 60	234 97	768 57	325 00
36 Sandwich	1	117 00	250 06	4,728 25	5,095 25	652 35
37 Sarnia	1	118 00	1,152 00	1,048 81	2,318 81	800 00
38 Sault Ste Marie	1	124 00	1,000 00	1,076 25	2,200 25	1,080 00
39 Seaforth	1	52 00	518 21	346 24	916 45	565 00
40 Sturgeon Falls	1	89 00	1,890 00	218 15	2,197 15	997 50
41 Sudbury	1	76 00	771 22	864 78	1,712 20	1,228 00
42 Thorold	1	86 00	1,004 00	1 13	1,091 13	700 00
43 Trenton	1	149 00	1,686 99	220 68	2,056 67	881 43
44 Vankleekhill	1	146 00	812 00	485 75	1,443 75	1,000 00
45 Walkerton	1	119 00	724 04	219 41	1,062 45	600 00
46 Wallaceburg	1	54 00	1,232 33	175 96	1,462 29	923 77
47 Waterloo	1	67 00	900 00	233 51	1,200 51	500 00
48 Whitby	1	31 00	200 00	141 61	372 61	275 00
Totals	57	6,154 00	62,261 59	45,154 07	113,569 66	49,076 49
Totals.						
1 Counties, etc	254	12,796 24	92,458 83	54,828 00	160,084 07	80,371 20
2 Cities	80	11,821 44	138,627 03	61,700 79	211,849 26	80,751 59
3 Towns	57	6,154 00	62,261 59	45,154 07	113,569 66	49,076 49
4 Grand totals, 1902	391	30,471 68	293,348 45	161,682 86	485,502 99	210,199 28
5 " 1901	372	28,797 07	261,409 49	146,514 38	436,730 94	180,848 11
6 Increases	19	1,674 61	31,938 96	15,168 48	48,782 05	29,351 17
7 Decreases						
8 Percentages		6.28	60.42	33.3		48.27
Cost per pupil :		$ c.				
Counties		7 69				
Cities		11 54				
Towns		9 01				
Province		9 47				

SEPARATE SCHOOLS.—*Continued.*

Statement, Teachers, etc.—*Concluded.*

	ture.					Teachers.				
	Sites and building school houses.	Maps, apparatus, prizes and libraries.	All other purposes.	Total amount expended.	Balances.	Number of teachers.	Male.	Female.	Average salary made.	Average salary, female. (In addition, m'bers of Rel. Orders received free residence,
	$ c.	$ c.	$ c.	$ c.	$ c.				$	$
1	71 47	62 00	2,225 85	3,244 32	.....	4	1	3	500	255
2	73 56	87 97	1,396 83	2,782 36	115 28	5	.....	5	.....	245
3	144 00	10 90	689 62	2,344 52	616 48	6	1	5	600	200
4	320 97	.....	1,056 10	2,277 07	163 39	4	.....	4	.....	225
5	4,225 85	13 00	278 61	6,272 46	232 84	8	.....	8	.....	219
6	.....	17 00	823 23	2,665 23	157 08	8	.....	8	.....	238
7	.....	.....	246 56	1,096 56	108 13	4	.....	4	.....	212
8	50 00	.....	2,260 05	5,953 99	.....	15	1	14	650	223
9	.....	.....	365 99	965 99	608 70	3	.....	3	.....	200
10	12,453 67	.....	567 61	13,921 28	.....	3	.....	3	.....	300
11	99 00	.....	210 38	634 38	.....	1	.....	1	.....	325
12	.....	5 00	111 29	516 29	66 29	2	.....	2	.....	200
13	175 00	10 00	654 00	2,659 00	.....	10	.....	10	.....	200
14	.....	.....	130 30	705 30	263 36	2	.....	2	.....	287
15	.....	4 30	949 08	3,037 93	431 43	7	1	6	600	250
16	176 36	.....	2,765 64	4,086 86	118 20	5	1	4	500	225
17	.....	.....	45 35	335 35	88 57	1	.....	1	.....	290
18	.....	20 00	330 00	950 00	56 19	3	.....	3	.....	200
19	270 50	.....	322 51	1,862 90	21 37	4	.....	4	.....	322
20	21 00	.....	50 00	321 00	.....	1	.....	1	.....	270
21	259 55	10 45	251 82	1,920 32	1,411 26	4	.....	4	.....	356
22	.....	.....	373 53	791 53	.....	2	.....	2	.....	200
23	228 80	.....	247 92	976 72	816 64	2	.....	2	.....	250
24	.....	.....	161 91	561 91	568 32	2	.....	2	.....	200
25	.....	.....	32 25	332 25	5 77	1	.....	1	.....	300
26	288 87	.....	841 26	3,668 30	9 84	10	1	9	400	205
27	150 25	36 00	544 66	1,530 91	216 34	4	.....	4	.....	200
28	86 05	.....	1,176 51	5,495 71	.....	14	1	13	900	243
29	.....	.....	84 10	504 10	485 11	2	.....	2	.....	210
30	65 55	.....	685 53	1,531 08	418 77	4	.....	4	.....	300
31	.....	.....	462 66	1,564 14	17 09	4	.....	4	.....	238
32	460 50	.....	233 21	1,043 71	315 69	1	.....	1	.....	350
33	142 00	.....	286 79	1,691 79	1,169 59	6	1	5	500	220
34	.....	.....	776 33	1,990 23	954 35	5	.....	5	.....	235
35	100 00	.....	113 45	538 45	230 12	1	.....	1	.....	325
36	3,200 00	.....	309 75	4,162 10	933 15	3	.....	3	.....	217
37	.....	.....	1,830 00	1,830 00	488 81	4	.....	4	.....	300
38	59 00	6 00	1,064 25	2,200 25	.....	4	.....	4	.....	270
39	75	17 40	335 83	908 98	7 47	2	.....	2	.....	275
40	56 00	208 00	837 87	2,099 37	97 78	4	.....	4	.....	287
41	.....	25 00	338 95	1,591 95	120 25	4	.....	4	.....	375
42	44 36	.....	228 11	972 47	118 66	3	.....	3	.....	233
43	214 00	.....	636 73	1,732 16	324 51	4	.....	4	.....	218
44	.....	.....	6 50	1,006 50	437 25	6	.....	6	.....	167
45	10 75	.....	297 15	907 90	154 55	4	.....	4	.....	150
46	.....	.....	170 60	1,094 37	367 92	2	1	1	480	300
47	129 72	.....	288 00	917 72	282 79	3	.....	3	.....	167
48	.....	3 00	94 61	373 61	.....	1	.....	1	.....	275
	23.568 53	536 02	27,389 28	100,570 32	12,999 34	202	9	193	570	234
1	25,050 60	1,701 29	25,998 93	133,122 02	26,962 05	335	38	297	327	229
2	52,291 38	3,920 54	64,784 90	201,748 41	10,100 85	333	47	286	359	213
3	23,568 53	636 02	27,389 28	100,570 32	12,999 34	202	9	193	570	234
4	100,910 51	6,157 85	118,173 11	435,440 75	50,062 24	870	94	776	366	224
5	97,271 02	6,854 93	106,654 16	391,628 22	45,092 72	818	84	734	372	215
6	3,639 49	.....	11,518 95	43,812 53	4,969 52	52	10	42	.....	9
7	.....	697 08	.....	.....	.....	.....	.....	.....	6	.....
8	23 18	1 41	27 14	.....	.....	.....	10.08	89.02	.....	.....

ROMAN CATHOLIC

II.—TABLE G.—Attendance, Pupils in the

Counties, (including incorporated villages, but not cities or towns) etc.	Number of pupils.	Boys.	Girls.	Average daily attendance.	Percentage of average to total attendance.	Reading. First Reader, Part I.	First Reader, Part II.	Second Reader.	Third Reader.	Fourth Reader.	Fifth Reader.	Writing.	Arithmetic.
1 Bruce	833	442	391	565	68	205	79	197	193	152	7	833	833
2 Carleton	1,469	709	760	844	57	601	256	277	231	97	7	1,469	1,469
3 Essex	2,075	1,065	1,010	1,178	57	771	331	362	336	255	20	2,075	2,075
4 Frontenac	396	198	198	223	56	86	43	65	87	104	11	396	396
5 Grey	285	150	135	137	48	67	37	49	73	54	5	285	285
6 Hastings	281	150	131	115	41	71	42	53	63	48	4	281	281
7 Huron	516	289	227	286	55	98	67	91	105	137	18	516	516
8 Kent	591	308	283	295	50	215	105	78	95	77	21	591	591
9 Lambton	79	41	38	38	48	14	13	10	18	20	4	79	79
10 Lanark	98	52	46	48	49	26	11	21	23	17	..	98	98
11 Leeds and Grenville	204	95	109	118	58	45	27	34	28	37	33	204	..
12 Lennox & Addington	102	49	53	50	49	26	17	14	21	22	2	102	102
13 Lincoln	145	74	71	100	69	33	29	27	39	17	....	145	145
14 Middlesex	186	105	81	103	55	25	12	30	46	67	6	186	186
15 Norfolk	90	46	44	51	57	24	9	12	19	26	....	90	90
16 Northumberland	221	110	111	119	54	40	39	57	44	35	6	221	221
17 Ontario	92	48	44	54	59	22	10	11	12	26	11	92	92
18 Peel	24	14	10	12	50	3	2	6	9	3	1	24	24
19 Perth	203	111	92	103	51	38	21	41	41	59	3	203	203
20 Peterborough	35	17	18	17	49	11	4	6	3	10	1	35	35
21 Prescott and Russell	5,060	2,494	2,566	2,817	56	2,345	998	784	620	303	10	5,060	5,060
22 Renfrew	767	395	372	390	51	266	120	108	125	83	65	767	767
23 Simcoe	204	96	108	118	58	72	37	26	32	32	5	204	204
24 Stormont, Dundas and Glengarry	1,210	567	643	530	44	438	201	230	179	154	8	1,210	1,210
25 Waterloo	610	338	272	353	58	132	93	138	154	92	1	610	610
26 Wellington	432	231	201	251	58	124	67	69	70	98	4	432	432
27 Wentworth	20	12	8	9	45	3	2	6	6	2	1	20	20
28 York	74	38	36	51	69	21	17	23	9	4	....	74	74
29 Algoma District, etc	167	106	61	106	63	67	52	25	18	5	....	167	167
30 Nipissing District	850	399	451	333	39	449	124	129	90	47	11	850	850
Totals	17,319	8,749	8,570	9,414	54	6,338	2,865	2,979	2,789	2,083	265	17,319	17,319
Cities.													
1 Belleville	372	190	182	250	67	111	63	63	62	73	....	372	7
2 Brantford	345	179	166	249	72	79	50	78	66	72	....	345	34
3 Chatham	353	193	160	202	57	98	57	47	87	64	....	353	353
4 Guelph	361	176	185	259	72	57	65	89	81	69	....	361	361
5 Hamilton	1,608	793	815	1,203	75	474	243	305	276	240	70	1,608	1,608
6 Kingston	747	389	358	500	67	164	116	153	154	120	40	747	747
7 London	783	407	376	628	80	167	131	153	184	148	....	783	783
8 Ottawa	6,091	3,166	2,925	4,000	65	2,035	1,274	1,253	965	473	91	6,091	6,091
9 St. Catharines	350	194	156	270	77	82	37	72	75	84	....	350	350
10 St. Thomas	232	119	113	185	80	56	50	33	33	60	....	232	232
11 Stratford	351	184	167	232	66	68	68	66	67	82	....	351	351
12 Toronto	5,072	2,615	2,457	3,438	68	1,343	776	1,134	1,040	589	190	5,072	5,072
13 Windsor	698	378	320	490	70	195	185	108	144	66	....	698	698
14 Woodstock	117	64	53	71	81	34	14	21	23	25	....	117	117
Totals	17,480	9,047	8,433	11,977	68	4,963	3,129	3,575	3,257	2,165	391	17,480	17,480

SEPARATE SCHOOLS.—*Continued.*

various branches of instruction, Maps, etc.

	Drawing.	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Temperance and Hygiene.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.	Maps and prizes. Number of maps.	Number of schools giving prizes.	Number of trees planted on Arbor Day.
1	833	599	601	515	133	305	178	606	6	4	2	.....	.....	.....	65	3	4
2	1,234	741	390	608	179	397	794	910	7	7	7	.....	.....	31	97	8	53
3	1,923	1,215	1,406	1,001	352	578	691	1,324	72	20	20	1	.....	303	153	16	45
4	396	312	200	297	129	210	129	283	13	12	7	.....	.....	91	59	5	4
5	285	181	65	161	93	114	96	159	4	2	2	.....	.....	28	37	2	19
6	254	172	67	192	67	105	85	202	5	4	4	.....	.....	32	51	2	6
7	510	351	273	306	155	215	193	337	17	17	17	8	.....	60	69	2	5
8	455	314	301	372	103	134	167	301	22	21	21	12	9	44	47	4	.....
9	79	53	.....	53	23	36	42	79	4	4	4	4	.....	14	19	1	.....
10	98	46	29	54	27	40	22	77	.....	.....	.....	.....	.....	6	24	.....	.....
11	190	131	90	134	69	94	64	158	35	33	32	9	9	15	44	2	6
12	102	74	71	74	29	42	61	71	2	2	2	.....	.....	1	14	1	.....
13	145	111	145	128	18	56	145	145	.....	.....	.....	.....	.....	.....	11	.....	.....
14	186	163	167	148	72	114	134	186	5	6	5	.....	10	63	43	1	.....
15	90	57	90	66	26	45	26	90	.....	.....	.....	.....	.....	45	5	1	.....
16	189	178	.....	163	40	74	89	34	8	6	6	.....	.....	5	47	.....	.....
17	81	92	.....	70	37	49	49	.....	15	11	11	.....	11	37	8	.....	.....
18	24	19	.....	13	4	11	2	.....	1	1	1	.....	.....	3	10	.....	.....
19	203	143	138	143	55	85	73	108	4	3	3	.....	.....	51	37	.....	21
20	16	19	.....	16	6	10	10	.....	1	1	1	.....	.....	.....	6	.....	.....
21	3,431	2,342	845	1,943	339	1,032	874	906	27	9	8	.....	27	225	326	39	100
22	708	376	420	431	150	216	282	424	45	61	61	27	24	45	55	7	.....
23	204	139	144	95	37	33	46	157	5	5	5	.....	.....	18	18	1	6
24	1,069	589	647	515	183	242	173	846	8	8	5	.....	.....	18	68	2	22
25	600	442	421	411	124	287	266	568	27	1	1	.....	.....	103	68	2	61
26	396	246	277	235	153	183	165	243	3	3	3	.....	.....	26	64	3	13
27	20	15	20	15	3	9	3	20	1	1	1	.....	.....	3	4	.....	2
28	74	48	31	18	4	4	4	34	.....	.....	.....	.....	.....	.....	13	.....	.....
29	152	39	.....	39	.....	26	6	49	8	.....	.....	.....	.....	.....	11	1	.....
30	442	211	41	182	40	89	172	304	42	8	8	.....	37	119	54	6	32
	14,389	9,418	6,882	8,298	2,650	4,835	5,041	8,621	387	250	237	61	127	1,386	1,527	109	399
1	372	198	.....	198	73	135	135	372	.....	.....	.....	.....	.....	.....	20	.....	.....
2	345	345	345	138	138	138	216	345	.....	.....	.....	.....	.....	72	13	.....	.....
3	353	353	353	198	151	151	151	353	.....	.....	.....	.....	.....	.....	8	1	.....
4	361	361	361	239	69	150	150	361	.....	.....	.....	.....	.....	.....	28	3	.....
5	1,608	1,608	1,608	1,608	463	636	1,608	1,608	96	96	96	.....	96	.....	166	8	.....
6	747	547	747	747	160	314	314	747	30	40	40	.....	15	25	54	.....	.....
7	783	783	783	783	148	332	783	783	.....	.....	.....	.....	.....	.....	30	6	.....
8	5,056	3,767	4,083	3,390	503	2,281	1,093	4,850	229	91	91	5	2	339	207	23	16
9	350	268	316	268	97	159	205	350	.....	.....	.....	.....	.....	.....	16	.....	.....
10	232	126	232	93	60	93	93	232	.....	.....	.....	.....	.....	.....	12	1	.....
11	351	215	351	149	82	149	149	351	.....	.....	.....	.....	.....	.....	21	.....	.....
12	5,072	2,928	5,072	2,978	756	1,603	566	5,072	167	151	151	.....	57	.....	306	.....	.....
13	698	488	698	698	66	210	698	698	.....	.....	.....	.....	.....	.....	7	2	.....
14	117	117	117	117	26	48	117	117	.....	.....	.....	.....	.....	.....	11	1	.....
	16,445	12,104	15,066	11,604	2,792	6,399	6,278	16,239	522	378	378	5	170	436	899	45	16

ROMAN CATHOLIC

II.—Table G.—Attendance, pupils in the

Towns.	Number of pupils.	Boys.	Girls.	Average daily attendance.	Percentage of average to total attendance.	Reading. First Reader, Part I.	First Reader, Part II.	Second Reader.	Third Reader.	Fourth Reader.	Fifth Reader.	Writing.	Arithmetic.
1 Almonte	141	71	70	98	69	56	13	15	15	42	....	144	141
2 Amherstburg	293	129	164	183	62	70	31	62	53	45	32	293	293
3 Arnprior	419	202	217	253	60	131	54	67	92	75	....	419	419
4 Barrie	155	81	74	110	71	36	19	28	37	35	....	155	155
5 Berlin	451	243	208	338	75	82	58	117	113	81	....	451	451
6 Brockville	399	194	205	282	71	73	57	100	92	77	....	399	399
7 Cobourg	222	114	108	156	70	65	22	52	46	37	....	222	222
8 Cornwall	969	472	497	586	60	313	251	193	108	104	....	969	969
9 Dundas	136	66	70	109	80	45	21	26	31	13	....	136	136
10 Fort William	172	85	87	114	66	65	32	24	23	28	....	172	172
11 Galt	76	34	42	65	85	12	12	19	20	13	....	76	76
12 Goderich	71	39	32	55	77	19	8	13	15	16	....	71	71
13 Hawkesbury	713	378	335	619	87	257	218	121	59	58	....	713	713
14 Ingersoll	76	35	41	56	74	22	10	14	19	11	....	76	76
15 Lindsay	361	149	212	219	61	82	48	69	52	67	43	361	361
16 Mattawa	323	147	176	169	52	124	59	46	24	60	10	323	323
17 Newmarket	60	30	30	39	65	24	4	17	.....	15	....	60	60
18 Niagara Falls	156	85	71	107	68	35	22	33	38	28	....	156	156
19 North Bay	239	120	119	146	61	104	44	28	37	26	....	239	239
20 Oakville	43	26	17	24	56	14	4	8	9	8	....	43	43
21 Orillia	213	109	104	170	80	34	29	59	42	49	....	213	213
22 Oshawa	84	34	50	62	74	18	13	12	21	16	4	84	84
23 Owen Sound	117	62	55	77	66	20	12	20	38	27	....	117	117
24 Paris	62	30	32	48	77	8	7	16	9	22	....	62	62
25 Parkhill	47	19	28	30	64	6	13	7	13	8	....	47	47
26 Pembroke	541	280	261	352	65	154	112	110	76	89	....	541	541
27 Perth	245	132	113	168	68	66	26	41	56	56	....	245	245
28 Peterborough	791	386	405	493	62	194	155	167	157	118	....	791	791
29 Picton	49	26	23	36	73	11	9	13	6	10	....	49	49
30 Port Arthur	215	101	114	140	65	68	43	29	26	49	....	215	215
31 Prescott	206	119	87	137	66	41	16	43	46	60	....	206	206
32 Preston	87	51	36	61	70	20	8	20	23	16	....	87	87
33 Rat Portage	249	113	136	147	59	112	22	64	36	15	....	249	249
34 Renfrew	270	139	131	219	81	89	60	35	56	30	....	270	270
35 St. Mary's	61	25	36	45	74	19	5	8	19	10	....	61	61
36 Sandwich	165	72	93	86	52	48	23	36	38	20	....	165	165
37 Sarnia	222	104	118	143	64	46	32	58	37	49	....	222	222
38 Sault Ste. Marie	276	161	115	162	59	79	68	64	31	34	....	276	276
39 Seaforth	106	54	52	59	56	17	15	19	23	32	....	106	106
40 Sturgeon Falls	306	133	173	155	51	198	49	28	9	17	5	306	306
41 Sudbury	258	131	127	161	62	89	67	36	24	36	6	258	258
42 Thorold	124	56	68	82	66	20	34	14	23	33	....	124	124
43 Trenton	232	106	126	140	60	55	28	51	34	64	....	232	232
44 Vankleekhill	263	122	141	154	58	85	52	43	37	46	....	263	263
45 Walkerton	188	91	97	156	83	36	22	46	41	43	....	188	188
46 Wallaceburg	141	79	62	92	65	47	30	16	16	32	....	141	141
47 Waterloo	129	59	70	90	70	27	19	37	29	17	....	129	129
48 Whitby	43	24	19	33	77	7	6	11	11	8	....	43	43
Totals	11,165	5,518	5,647	7,420	66	3,243	1,962	2,155	1,860	1,845	100	11,165	11,165
Totals.													
1 Counties, etc	17,319	8,749	8,750	9,411	54	6,338	2,865	2979	2,789	2,083	265	17,319	17,319
2 Cities	17,480	9,047	8,433	11,977	68	4,968	3,129	3,575	3,257	2,165	391	17,480	17,480
3 Towns	11,165	5,518	5,647	7,429	66	3,243	1,962	2,155	1,860	1,845	100	11,165	11,165
4 Grand Totals, 1902	45,964	23,314	22,830	28,817	63	14,544	7,956	8709	7,906	6,093	756	45,964	45,964
5 " 1901	43,987	22,260	21,727	26,926	61	13,966	7,682	8,427	7,588	1,562	762	43,987	43,987
6 Increases	1,977	1,054	923	1,891	2	578	274	282	318	531	....	1,977	1,977
7 Decreases	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	.....
8 Percentages	.....	50.72	49.28	63	....	32	17	19	17	13	2	100	100

SEPARATE SCHOOLS.—*Concluded.*

various branches of instruction, Maps, etc.—*Concluded.*

	Drawing.	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Temperance and Hygiene.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.	Maps and prizes. Number of Maps.	Maps and prizes. No. of schools giving prizes.	No. of trees planted on Arbor Day.
1	141	83	141	83	40	55	70	141	....	....	....	....	....	40	21	1	....
2	261	195	293	192	51	104	45	208	23	32	32	....	32	....	11	1	....
3	419	419	419	419	75	75	75	300	6	....	....	....	....	....	17	....	....
4	155	155	155	100	35	72	35	155	....	....	....	....	....	....	12	....	....
5	451	321	321	321	81	194	81	451	....	....	....	....	....	....	25	....	....
6	399	269	399	269	77	169	117	399	....	....	....	....	....	....	19	....	....
7	222	135	222	157	64	64	64	222	....	....	....	....	....	....	9	....	....
8	969	505	969	505	104	212	212	969	....	....	....	....	....	....	25	1	....
9	136	136	136	136	13	44	22	136	....	....	....	....	....	....	10	1	....
10	172	172	172	75	28	51	51	172	....	....	....	....	....	....	1	....	....
11	64	64	76	64	13	33	20	76	....	....	....	....	....	....	6	....	....
12	71	58	71	31	31	31	31	71	....	....	....	....	....	....	8	1	....
13	713	500	713	456	35	240	115	713	58	....	....	....	....	....	17	....	2
14	76	30	.....	44	30	30	30	76	....	....	....	....	....	....	5	....	....
15	361	361	182	162	110	162	110	361	....	43	43	....	....	....	12	....	....
16	320	196	282	198	28	81	28	....	12	9	9	....	....	10	12	....	....
17	60	60	60	32	15	15	15	60	....	....	....	....	....	....	10	....	....
18	156	156	156	66	28	66	66	140	....	....	....	....	....	....	17	....	....
19	239	239	....	91	26	63	26	....	....	....	....	....	....	....	10	....	....
20	43	34	43	25	17	10	25	43	....	....	....	....	....	....	5	1	....
21	213	150	213	150	49	91	91	213	....	....	....	....	....	....	11	....	....
22	84	66	66	66	20	41	41	84	4	4	4	....	4	....	10	1	....
23	117	85	117	117	65	85	117	117	....	....	....	....	....	....	4	....	....
24	62	54	62	62	22	28	22	62	....	....	....	....	....	....	6	1	....
25	47	28	47	28	8	21	8	....	....	....	....	....	....	....	9	....	....
26	541	367	541	367	89	172	172	541	....	....	....	....	....	....	22	1	....
27	245	179	245	112	56	112	153	245	....	....	....	....	....	....	1	....	24
28	791	502	730	597	173	335	335	731	....	....	....	....	....	....	34	....	....
29	49	38	.....	29	10	10	10	.....	....	....	....	....	....	....	7	....	....
30	215	185	215	215	75	75	75	215	....	....	....	....	....	....	6	1	....
31	206	165	146	206	60	106	60	103	....	....	....	....	....	....	15	....	....
32	87	67	.....	67	16	39	21	87	....	....	....	....	....	....	10	1	....
33	249	249	249	51	51	51	115	249	....	....	....	....	....	....	11	....	....
34	270	181	86	86	30	30	30	210	....	....	....	....	....	....	11	1	....
35	61	42	61	29	10	29	29	.....	....	....	....	....	....	....	7	....	....
36	165	84	.....	84	17	58	84	....	....	....	....	....	....	....	3	....	....
37	222	176	.....	176	49	86	49	....	....	....	....	....	....	....	19	1	....
38	276	197	276	197	65	65	129	276	....	....	....	....	....	....	6	....	....
39	106	74	106	74	32	55	32	106	....	....	....	....	....	....	9	1	....
40	306	108	306	306	22	31	22	306	8	5	5	....	....	....	6	....	2
41	258	258	258	169	42	102	102	258	6	6	6	....	....	42	8	1	....
42	124	70	124	70	33	70	33	124	....	....	....	....	....	....	10	....	....
43	232	232	232	232	64	98	98	232	....	....	....	....	....	98	10	....	....
44	263	263	263	263	43	43	30	263	....	....	....	....	....	....	13	....	6
45	188	188	188	188	43	84	188	188	....	....	....	....	....	....	22	1	....
46	141	64	141	64	32	48	48	64	....	....	....	....	....	64	8	1	....
47	129	83	129	46	17	46	28	129	....	....	....	....	....	....	12	1	....
48	43	23	.....	30	8	19	8	43	....	....	....	....	....	....	8	1	....
	11,118	8,266	9,611	7,507	2,102	3,801	3,368	9,599	117	99	99	....	36	254	554	19	34
	14,389	9,418	6,882	8,298	2,650	4,835	5,041	8,621	387	250	237	61	127	1,386	1,527	109	399
	16,445	12,104	15,066	11,604	2,792	6,399	6,278	16,239	522	378	378	5	170	436	899	45	16
	11,118	8,266	9,611	7,507	2,102	3,801	3,368	9,599	117	99	99	....	36	254	550	19	34
	41,952	29,788	31,559	27,409	7,544	15,035	14,687	34,459	1,026	727	714	66	333	2,076	2,976	173	449
	40,646	27,454	27,865	25,211	7,130	14,057	13,505	29,203	952	760	756	165	706	1,203	2,974	128	514
	1,306	2,334	3,694	2,198	414	978	1,182	5,256	74	....	....	....	....	373	2	45	....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	42	99	373	.....	.....	.....	65
	91	65	69	60	16	33	32	75	2	2	2	....	1	4	.....	44	....

COLLEGIATE INSTITUTES

I.—Table H.—

Collegiate Institutes.	Receipts.						Teacher's salaries.
	Legislative grants.	Municipal grants (county).	Municipal grants (local).	School fees.	Balances and other sources.	Total receipts.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1 Aylmer	879 05	1,481 38	1,650 00	910 50	110 00	5,030 93	3,750 00
2 Barrie	1,119 30	1,069 30	2,000 00	1,702 50	2,229 37	8,120 47	5,684 88
3 Brantford	1,295 33	.....	7,900 00	2,639 65	629 38	12,464 36	8,900 00
4 Brockville	1,139 53	1,762 00	6,300 00	1,197 88	1,002 81	11,402 22	6,866 68
5 Chatham	1,286 68	1,809 37	5,280 00	1,325 90	514 30	10,216 25	7,800 00
6 Clinton	938 20	1,632 78	1,600 00	890 25	696 82	5,758 11	4,492 31
7 Cobourg	*1,040 34	940 34	3,556 50	965 05	764 84	7,267 07	4,995 00
8 Collingwood	974 54	974 54	2,300 00	945 00	665 80	5,809 88	4,370 00
9 Galt	1,239 61	2,007 40	4,000 00	1,884 50	247 44	9,378 95	7,020 83
10 Goderich	1,121 67	1,321 50	2,600 00	1,472 00	2,310 17	8,825 34	5,415 75
11 Guelph	1,147 36	256 00	6,630 00	433 50	275 31	8,742 17	6,316 63
12 Hamilton	†5,861 80	.....	22,758 06	4,435 50	.....	33,055 36	16,540 00
13 Ingersoll	1,001 32	1,575 61	2,436 00	594 50	201 27	5,808 70	4,740 00
14 Kingston	*2,415 65	.....	5,394 00	4,300 20	1,525 39	13,635 24	9,595 56
15 Lindsay	1,304 17	1,829 16	3,950 56	1,662 75	158 54	8,905 18	6,666 65
16 London	*1,591 55	1,200 00	22,245 97	3,657 00	591 73	29,286 25	21,241 00
17 Morrisburg	1,074 16	2,385 37	2,388 33	378 00	3,352 52	9,578 38	5,111 62
18 Napanee	1,038 05	2,700 00	2,800 00	148 50	1,607 34	8,293 89	5,070 75
19 Niagara Falls	1,129 64	1,800 00	3,700 00	.....	1,986 57	8,616 21	5,615 00
20 Orillia	1,064 89	1,014 89	2,800 00	1,355 95	1,865 65	8,101 38	5,047 14
21 Ottawa	1,288 81	.....	40,995 00	8,017 33	393 84	51,294 98	17,130 00
22 Owen Sound	1,242 86	3,083 12	5,730 00	2,399 75	283 89	12,739 62	8,603 00
23 Perth	969 79	1,381 46	3,152 72	318 00	334 25	6,156 22	4,655 00
24 Peterborough	1,217 83	.....	6,000 00	2,423 00	674 20	10,315 03	7,490 00
25 Renfrew	*1,717 21	1,480 68	2,450 00	3 00	2,896 04	8,546 93	4,490 95
26 Ridgetown	926 42	2,393 40	2,000 00	889 00	3,280 81	9,489 63	4,550 00
27 St. Catharines	1,244 63	.....	6,461 35	15 00	1,017 54	8,738 52	7,052 40
28 St. Mary's	912 37	799 20	2,350 00	1,148 00	479 99	5,689 56	4,562 50
29 St. Thomas	1,344 31	1,592 86	7,271 08	1,166 00	170 00	11,544 25	8,340 00
30 Sarnia	1,057 90	1,945 74	3,778 00	115 00	1,375 91	8,272 55	5,776 11
31 Seaforth	1,005 68	1,652 97	1,900 00	1,253 80	1,370 09	7,183 54	4,515 76
32 Stratford	*2,000 10	1,300 00	6,000 00	3,397 41	298 87	13,686 38	7,256 49
33 Strathroy	965 34	1,894 97	2,000 00	1,088 00	370 30	6,318 61	5,030 00
34 Toronto (Harbord)	1,369 39	.....	15,047 33	3,323 00	6,066 92	25,806 64	19,850 00
35 Toronto (Jameson)	1,340 70	.....	15,047 33	6,073 00	68 35	22,529 38	15,885 00
36 Toronto (Jarvis)	1,335 09	.....	15,047 34	5,884 50	173 35	22,440 28	16,103 69
37 Toronto Junction	943 78	489 91	4,700 00	1,468 50	1,407 24	9,009 43	5,360 00
38 Whitby	848 32	1,270 89	2,400 00	434 75	232 74	5,186 70	4,066 64
39 Windsor	1,194 60	1,392 18	6,700 00	.....	592 35	9,879 13	7,234 00
40 Woodstock	*1,741 71	1,776 72	3,400 00	1,993 02	549 88	9,461 33	7,160 00
Totals	54,020 74	48,163 74	264,719 57	72,909 19	42,771 81	482,585 05	310,351 34

* Grant for Technical Education included. † Grant for Normal College included.

AND HIGH SCHOOLS.

Financial Statement.

	Expenditure.						Charges per year.
	Buildings, sites and all permanent improvements.	Repairs to school accommodation.	Library, scientific apparatus, maps, etc., drawing models or equipment for physical education.	School books, stationery, prizes, fuel, examinations, and other expenses.	Total expenditure.	Balances.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
1	.....	39 51	22 37	1,228 05	5,030 93	.....	Res. Form I, $5; others $10.
2	.....	33 15	97 06	1,236 74	7,051 83	1,068 61	$10.
3	181 87	.....	89 09	2,587 43	11,758 39	700 97	Res. $10: non-res. $16.
4	.....	400 00	12 90	1,859 68	9,139 26	2,262 96	Res. F. I $5; res. F's II, III, IV, $10; Co. $5.
5	272 83	.....	483 84	981 16	9,557 83	678 82	Res. F. I free; res. other forms $6; Co. $10.
6	.....	125 19	58 83	1 086 78	5,758 11	.....	$6, $8, $10.
7	600 00	14 19	635 91	810 50	7,084 70	182 37	Res. $12; non-res. $14; Co. $7.50.
8	9 00	111 34	34 15	874 82	5,399 31	410 57	Town $7.50; others $10.
9	203 75	191 66	113 75	1,512 41	9,047 40	331 55	Co. $10; others $14.
10	.....	91 59	41 70	613 73	6,162 77	2,662 57	Res. $5, 7, $10; Co. $6, $8, $10; non-res. $8, $10, $12.
11	.....	299 31	10 54	1,775 93	8,482 41	309 76	Res. free; Co. $10; others $20.
12	.....	287 83	.....	16,227 50	33,055 36	.....	Res. F. I $2.50; others $10; non-res. $20.
13	.....	80 26	236 72	562 94	5,619 92	188 78	$7.50.
14	64 83	224 29	362 07	3,093 39	13,340 14	295 10	Res. $10, $12, $15, $33; non-res. $20, $25, $38.
15	17 75	503 26	202 00	1,364 01	8,753 67	151 51	$7.50; $10; $20.
16	.....	263 85	452 59	6,927 92	28,885 36	400 89	City and Co. $10; others $30.
17	407 89	357 97	.....	707 69	6,585 17	2,993 21	Free.
18	.....	93 09	96 73	1,093 40	6,353 97	1,939 92	Co. free; others $10.
19	.....	614 20	154 36	1,583 71	7,967 27	648 94	Free.
20	250 00	189 60	168 00	1,186 47	6,841 21	1,260 17	Town $5; others $10.
21	25,340 54	47 93	78 40	3,345 93	45,941 90	5,353 08	Res. $20, $25; non-res. $45.50.
22	64 46	183 36	69 48	1,721 75	10,641 99	2,097 63	Res. $8 to $12; Co. $10; non-res. $12 to $15.
23	195 30	112 93	3 15	979 53	5,945 91	210 31	Co. $5; non-res. $16.
24	1,100 00	.....	.....	1,725 03	10,315 03	.....	$10; $25.
25	1,337 18	.....	158 03	936 23	6,922 39	1,624 54	Town free; others $15.
26	1,374 26	205 70	180 00	3,162 09	9,472 05	17 58	Res. $6; others $10.
27	536 60	142 30	.....	1,003 50	8,734 89	3 63	Res. free; others $16.
28	.....	167 34	.....	720 61	5,450 15	239 11	Res. 1st year free; thereafter $5; others $10.
29	375 00	140 65	.....	2,688 60	11,544 25	.....	City, F's. I and II free; F's. III & IV $10; Co. $10; others $30.
30	.....	.....	652 37	1,844 07	8,272 55	.....	Free.
31	184 00	7 79	126 85	807 94	5,642 34	1,511 20	F. I. $6; F. II $8; F. III, IV $10.
32	1,322 09	.....	108 15	3,351 13	12,037 86	1,648 52	$10.
33	.....	37 31	.....	1,123 55	6,190 86	127 75	F. I, town free; others $10.
34	.....	139 26	61 30	6,218 13	26,268 69		F. I free; others $7 to $32.
35	.....	125 32	156 53	5,577 14	21,744 01	.....	F. I free; F. II $7 to $23; F's. III & IV $32.
36	.....	351 92	239 97	6,067 99	22,763 57		86 to $32.
37	1,468 28	.....	238 11	1,735 15	8,801 54	207 89	$10; $15.
38	.....	136 36	113 15	755 32	5,071 47	115 23	Res. $6; Co. $7.50; others $10.
39	646 19	145 60	53 32	1,766 53	9,845 64	33 49	Free
40	923 39	20 27	75 00	1,280 14	9,458 89	2 53	City and Co. $7.50; others $10.
	36,875 15	5,910 33	5,610 57	94,123 84	452,871 23	29,713 82	8 free; 32 fee.

COLLEGIATE INSTITUTES

I.—Table H.—

High Schools.	Receipts.						Teachers' salaries.
	Legislative grants.	Municipal grants (county).	Municipal grants (local).	School fees.	Balances and other sources.	Total receipts.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1 Alexandria	627 86	746 94	2,123 00	.....	2,881 98	6,379 78	2,750 00
2 Almonte	701 30	701 30	2,750 03	210 75	343 22	4,706 60	3,310 30
3 Arnprior	590 19	599 19	2,100 00	91 00	1,220 60	4,609 98	2,450 00
4 Arthur	589 18	791 22	750 00	681 25	416 00	3,228 64	2,172 00
5 Athens	654 20	1,720 00	1,000 00	306 00	385 60	4,065 80	3,060 00
6 Aurora	605 16	700 00	600 00	599 00	455 40	2,959 56	2,106 00
7 Beamsville	472 96	530 00	710 00	15 00	431 27	2,159 23	1,350 00
8 Belleville	790 78	497 50	3,981 55	260 00	.....	5,529 83	4,525 00
9 Berlin	782 24	2,364 44	2,350 91	1,241 00	196 79	6,934 47	4,618 36
10 Bowmanville	778 63	778 63	2,350 00	390 27	702 96	5,000 49	3,766 61
11 Bradford	562 27	562 27	600 00	623 50	131 46	2,479 50	2,071 35
12 Brampton	838 92	1,768 92	2,450 00	1,274 00	45 32	6,377 16	4,690 00
13 Brighton	455 00	695 07	900 00	196 85	334 47	2,581 39	1,724 98
14 Caledonia	551 78	1,320 87	920 00	40 50	719 83	3,552 98	2,139 95
15 Cambellford	603 92	603 92	1,939 01	710 25	146 44	4,003 54	2,841 17
16 Carleton Place	708 22	708 22	2,300 00	234 59	276 58	4,227 52	2,931 68
17 Cayuga	554 92	1,649 55	650 00	.....	539 23	3,393 70	2,150 00
18 Colborne	450 22	449 67	1,205 01	105 75	1,434 12	3,644 77	1,525 00
19 Cornwall	874 67	.....	3,430 10	.....	2,182 61	6,497 68	1,649 76
20 Deseronto	642 77	642 77	1,500 00	213 75	775 90	3,775 19	2,566 68
21 Dundas	682 92	1,032 92	722 72	597 00	636 95	3,671 61	2,449 74
22 Dunnville	566 28	2,005 39	800 00	3 00	750 87	4,152 54	2,755 17
23 Dutton	566 87	1,483 48	500 00	538 00	229 96	3,317 31	2,265 00
24 Elora	534 08	713 08	800 00	559 25	61 86	2,668 27	2,100 00
25 Essex	656 66	656 66	500 00	3 00	1,173 70	2,989 93	2,521 33
26 Fergus	568 53	568 53	1,800 00	299 50	1,844 00	5,080 56	2,225 00
27 Forest	577 87	1,225 57	500 00	329 00	1,096 15	3,728 09	2,112 50
28 Fort William	921 39	.....	2,500 00	.....	332 58	3,753 88	1,790 15
29 Gananoque	657 87	907 87	1,722 89	126 50	38 00	3,453 13	2,483 18
30 Georgetown	584 79	719 86	952 62	617 00	.....	2,874 27	2,250 00
31 Glencoe	622 02	756 86	800 00	570 00	83 55	2,842 41	2,030 00
32 Gravenhurst	945 83	.....	750 00	412 65	3 60	2,112 08	1,361 16
33 Grimsby	427 50	660 00	756 00	12 00	550 86	2,280 36	1,300 00
34 Hagersville	593 34	1,404 01	1,150 00	.....	1,871 25	5,018 60	2,269 89
35 Harriston	568 76	568 76	1,300 00	848 03	588 49	3,864 01	2,622 19
36 Hawkesbury	612 53	1,612 53	1,100 00	.....	634 68	3,959 73	2,212 00
37 Iroquois	709 96	1,657 39	400 00	362 00	1,544 09	4,673 44	3,070 00
38 Kemptville	712 08	915 92	1,732 18	600 00	146 00	4,106 18	3,350 00
39 Kincardine	726 23	1,451 58	1,035 00	1,163 50	275 36	4,651 70	3,461 00
40 Leamington	650 14	1,278 67	1,400 00	25 50	911 82	4,286 13	3,131 67
41 Listowel	624 23	800 00	1,060 06	920 50	111 08	3,455 81	2,525 00
42 Lucan	673 31	673 31	600 00	1,011 00	583 42	3,541 04	2,790 00
43 Madoc	568 64	.....	700 00	547 00	1,135 57	2,951 21	2,199 90
44 Markham	738 82	1,530 00	200 00	1,401 00	291 06	4,160 88	3,082 00
45 Meaford	755 25	1,593 03	1,185 00	744 50	92 11	4,369 89	3,250 00
46 Mitchell	639 17	799 20	1,100 00	563 90	297 50	3,399 77	2,475 10
47 Mount Forest	736 78	1,061 78	1,400 00	762 25	1,346 84	5,307 65	2,917 41
48 Newburgh	541 14	1,050 00	375 00	.....	403 75	2,969 89	2,220 00
49 Newcastle	466 60	466 60	1,000 00	117 00	659 69	2,709 29	1,250 00
50 Newmarket	637 34	782 00	800 00	784 20	237 31	3,240 85	2,346 13
51 Niagara	417 10	490 00	550 00	.....	191 20	1,648 30	1,250 00
52 Niagara Falls South	553 28	553 28	1,665 94	.....	551 77	3,324 27	1,941 26
53 North Bay	500 00	.....	685 00	.....	.....	1,185 00	676 64
54 Norwood	633 30	692 54	.....	517 00	2,672 06	4,514 90	2,200 00

AND HIGH SCHOOLS.—*Continued.*

Financial Statement.—*Continued.*

	Expenditure.						
	Buildings, sites and all permanent improvements.	Repairs to school accommodations.	Library, scientific apparatus, maps, etc., drawing models or equipment for physical education.	School books, stationery, prizes, fuel, examinations and other expenses.	Total expenditure.	Balances.	Charges per year.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
1	89 46	140 00	.....	2,125 81	5,105 27	1,274 51	Free.
2	600 00	.....	.....	285 26	4,195 56	511 04	Res. $1; Co. $6; others, $11.
3	33 28	.....	.....	408 30	2,891 58	1,718 40	Res. free; non-res. $10.
4	263 26	62 23	138 84	544 16	3,180 49	48 15	$10.
5	.....	29 71	40 00	555 97	3,685 68	380 12	Res. free: Co. $5; others, $10.
6	20 78	14 39	22 28	331 11	2,494 56	465 00	$10.
7	8 41	10 00	20 92	679 19	2,068 52	90 71	Free.
8	131 92	.....	4 60	868 31	5,529 83	.....	Res. free: $25.
9	189 70	54 31	255 69	1,816 41	6,934 47	.....	$10.
10	.....	78 13	33 40	947 67	4,825 81	174 68	F. I $4, F. II $6; Fs. III and IV $7.50.
11	.....	56 79	.....	316 00	2,444 14	35 36	Res. F I free; others $10
12	999 95	.....	19 65	599 88	6,309 48	67 68	$10.
13	.....	44 36	62 29	246 50	2,078 13	503 26	Res. free; Co. $7.50.
14	178 16	22 10	.....	589 14	2,929 65	623 33	Free; other Co's. $4.50.
15	227 68	.....	29 92	904 77	4,003 54	.....	H. S. Disct. $6; Co. $7.50; others $10.
16	.....	51 01	52 41	572 74	4,607 84	619 68	Res. free; Co. $5; non-res. $10.
17	.....	233 26	99 66	757 59	3,240 51	153 19	Free.
18	193 60	91 50	56 94	442 02	2,309 06	1,335 71	Free; non-res. and Co. $7.50.
19	122 60	100 0	.....	1,054 22	5,926 58	571 10	Free.
20	.....	67 73	22 00	901 29	3,557 70	217 49	Res. free; others $10.
21	122 79	11 69	40 00	532 23	3,156 45	515 16	Town, F. I free; $9.50; $10.
22	95 00	52 42	10 00	500 51	3,413 10	739 44	Town and County free; others $10.
23	68 96	41 00	22 93	580 88	2,878 77	438 54	$10.
24	79 08	13 03	24 00	267 90	2,484 01	184 26	Village $5; others $10.
25	.....	164 67	.....	219 09	2,905 09	84 84	Free; non-res. $10.
26	.....	42 24	.....	2,529 81	4,797 05	283 51	$10.
27	75 00	35 70	.....	841 68	3,042 88	685 21	H. S. Disct. $10.
28	41 35	.....	58 42	1,891 56	3,761 66	2 22	Free.
29	.....	211 91	68 00	690 04	3,453 13	.....	$5.
30	6 00	62 10	50 50	505 67	2,874 27	.....	F. I $7; others $10.
31	.....	18 65	95 42	684 79	2,830 03	12 38	Res. and Co. $10; others $20.
32	94 84	.....	.....	653 66	2,079 66	32 42	$10.
33	.....	92 04	23 27	166 77	1,582 08	698 28	Free.
34	15 31	38 45	22 50	2,498 68	4,874 81	143 79	Free.
35	260 00	153 91	100 70	652 83	3,789 63	74 38	$10.
36	.....	.....	.....	588 98	2,798 98	1,160 75	Free.
37	116 06	.....	5 35	786 00	3,977 41	696 03	Free since Sept., 1902.
38	.....	62 30	15 11	678 77	4,106 18	.....	Res. free. Co. $5; others 80% of cost of maintenance.
39	49 08	.....	84 28	502 88	4,097 24	554 46	H. S. Disct. $8; others $10.
40	.....	119 48	54 93	330 55	3,636 63	649 50	Co. free; non-res. $10.
41	.....	.....	50 50	649 19	3,224 69	231 12	Res. $10; non-res. $12.
42	88 70	.....	8 59	529 71	3 417 00	124 04	$10.
43	.....	202 00	39 30	510 01	2,951 21	.....	H. S. Disct. $7; Co. $10.
44	.....	143 76	50 77	389 16	3,665 69	195 19	$10.
45	.....	277 59	.....	781 85	4,309 44	60 45	Town $8; others $10.
46	.....	.....	45 00	690 69	3,210 79	188 98	Res. $6; non-res $10.
47	.....	120 09	.....	2,245 07	5,282 57	25 08	$10; res. in F. I free.
48	20 00	42 00	33 88	360 31	2,676 19	293 70	Free.
49	.....	.....	19 62	212 45	1,482 07	1,227 22	$7.50.
50	58 46	99 30	48 23	366 86	2,918 98	321 87	$10.
51	.....	34 93	37 50	158 37	1,480 80	167 50	Free.
52	.....	13 35	11 71	375 24	2,371 56	952 71	Free.
53	.....	.....	.....	4 22	680 86	504 14	Free.
54	780 31	50 00	.....	1,333 34	4,563 65	151 25	$6.

COLLEGIATE INSTITUTE

I.—Table H —

High Schools.	Receipts. Legislative grants.	Municipal grants (county).	Municipal grants (local).	School fees.	Balances and other sources.	Total receipts.	Teachers' salaries.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
55 Oakville	459 61	474 59	614 53	118 50	879 60	2,546 83	1,800 00
56 Omemee	446 77	446 77	653 01	228 00	13 00	1,787 55	1,450 00
57 Orangeville	783 52	1,050 00	1,950 00	1,286 00	130 51	5,200 03	4,312 68
58 Oshawa	733 84	733 84	2,900 00	910 65	277 49	5,555 82	4,250 00
59 Paris	630 84	630 84	2,200 00	245 50	26 72	3,733 90	2,648 88
60 Parkhill	563 30	563 30	.....	625 75	910 48	2,662 83	1,950 00
61 Pembroke	701 09	701 09	3,125 50	.....	32 05	4,557 73	3,628 50
62 Petrolea	760 87	1,288 30	2,000 00	364 00	2,428 21	6,841 38	3,733 36
63 Picton	853 21	2,507 12	3,500 00	8 00	141 00	7,009 33	4,516 66
64 Port Arthur	1,101 94	.....	2,250 00	.....	687 74	3,989 68	2,400 00
65 Port Dover	445 80	477 83	651 76	.....	103 13	1,678 02	1,400 00
66 Port Elgin	576 69	719 80	950 00	547 25	70 52	2,864 26	2,351 50
67 Port Hope	815 14	815 14	2,183 40	1,079 00	560 50	5,453 12	4,333 34
68 Port Perry	666 61	1,032 88	1,333 40	430 75	125 11	3,568 75	3,060 00
69 Port Rowan	416 42	638 41	618 13	.....	.....	1,672 96	1,250 00
70 Prescott	590 26	400 00	1,960 35	60 00	41 00	3,051 61	2,196 64
71 Rat Portage	500 00	.....	2,174 80	.....	84 65	2,759 55	2,000 00
72 Richmond Hill	467 82	808 14	100 00	487 00	366 93	2,229 89	1,499 99
73 Sault Ste. Marie	500 00	.....	1,300 00	278 00	1,528 35	3,606 35	2,400 00
74 Simcoe	757 84	1,910 74	1,999 68	18 00	80 00	4,766 25	3,903 50
75 Smith's Falls	673 13	673 13	2,133 40	204 00	77 00	3,740 66	3,270 00
76 Smithville	497 42	685 00	800 00	134 60	611 48	2,728 50	1,752 50
77 Stirling	468 26	468 26	350 00	249 00	881 16	2,366 68	1,682 33
78 Streetsville	438 85	938 85	275 00	166 50	631 39	2,450 59	1,466 25
79 Sydenham	555 82	1,600 00	.....	455 00	88 97	2,699 79	2,146 99
80 Thorold	598 54	597 79	1,400 00	.....	393 85	2,990 18	2,220 00
81 Tillsonburg	606 71	606 71	1,200 00	290 00	583 71	3,287 13	2,379 80
82 Trenton	644 81	266 56	2,211 38	239 25	770 37	4,102 37	2,585 12
83 Uxbridge	668 34	1,021 72	1,175 98	350 70	64 00	3,281 74	2,628 76
84 Vankleekhill	820 21	1,870 21	1,000 00	98 00	833 47	4,621 89	3,150 00
85 Vienna	430 56	580 00	500 00	.....	781 16	2,291 72	1,196 30
86 Walkerton	741 28	1,281 71	2,000 00	774 00	630 27	5,427 26	3,799 96
87 Wardsville	430 18	430 18	335 00	243 75	302 03	1,741 14	1,248 06
88 Waterdown	500 59	900 59	600 00	236 50	68 25	2,302 93	1,950 00
89 Waterford	587 70	1,337 87	600 00	.....	862 55	3,382 12	2,120 00
90 Watford	643 70	1,458 80	.....	399 00	2,560 63	5,062 13	2,725 00
91 Welland	655 26	1,510 16	1,650 00	.....	628 83	4,444 25	2,899 96
92 Weston	484 09	700 00	500 00	357 50	132 71	2,174 30	1,567 73
93 Wiarton	587 48	815 90	1,000 00	383 00	205 16	2,991 84	2,350 00
94 Williamstown	599 62	599 62	2,411 70	.....	2,653 19	6,264 13	2,589
1 Totals, High Schools	58,629 26	81,960 95	119,681 48	32,891 81	57,104 47	350,267 98	237,050 51
2 " Coll. Institutes	54,020 74	48,163 74	264,719 57	72,909 19	42,771 81	482,584 05	310,351 34
3 Grand totals, 1902	112,650 00	130,124 69	384,401 05	105,801 01	99,876 28	832,853 03	547,401 85
4 " 1901	109,200 00	129,104 03	345,285 30	99,864 09	101,172 27	784,625 69	535,421 41
5 Increases	3,450 00	1,020 66	39,115 75	5,936 92	.....	48,227 34	11,880 44
6 Decreases	.....	.....	.....	.....	1,295 99	.....	.....
7 Percentages	13 53	15 62	46 15	12 70	12	.....	71 12
Cost per pupil	$31 45	.....	.....	.....	.....	.....	.....

AND HIGH SCHOOLS.—*Continued.*

Financial Statement.—*Concluded.*

	Expenditure.						
	Buildings, sites and all permanent improvements.	Repairs to school accommodations.	Library, scientific apparatus, maps, etc., drawing models or equipment for physical education.	School books, stationery, prizes, fuel, examinations and other expenses.	Total expenditure.	Balances.	Charges per year.
	c.	$ c.	$ c.	$ c.	$ c.	$ c.	
55	520 00	80 00	50 00	75 00	2,525 00	21 83	$5 ; $8.
56	.....	108 10	.....	229 45	1,787 55	.....	H. S. Dist. free ; others $10.
57	.....	83 42	140 58	663 35	5,200 03	.....	Town $9 ; others $10.
58	304 58	162 22	98 05	740 97	3,555 82	.....	F. I. free ; others, $7.50.
59	.....	42 58	42 37	461 02	3,194 85	$39 05	Town free ; others $10.
60	.....	54 13	.....	521 45	2,525 58	137 25	Res. $6, $8 ; non-res. $10.
61	161 49	22 00	10 13	740 61	4,557 73	.....	Free.
62	.....	43 33	47 55	503 10	4,327 34	2,514 04	Free.
63	.....	416 55	285 93	1,179 08	6,398 22	611 11	Town and Co. free ; others $10.
64	.....	.....	54 42	1,535 26	3,989 68	.....	Free.
65	.....	.....	58 89	219 13	1,678 02	.....	Free.
66	.....	.....	.....	506 88	2,858 38	5 80	Res. $6.50 ; Co. and non-res. $10
67	.....	.....	137 18	982 60	5,453 12	.....	Co. $7.50 ; Town and others $9
68	68 50	.....	10 33	387 50	3,526 33	42 42	$7.50.
69	100 00	28 75	.....	297 21	1,672 96	.....	Free.
70	.....	32 15	23 80	769 78	3,022 37	29 24	Res. free ; non-res, $5.
71	.....	15 00	291 75	452 80	2,759 55	.....	Free.
72	196 45	12 60	8 38	264 25	1,981 67	248 22	$10.
73	183 40	.....	8 36	322 00	2,913 76	692 59	$10.
74	.....	29 95	108 50	724 30	4,766 25	.....	Free ; non-res. $10.
75	.....	26 22	101 12	343 32	3,740 66	.....	Res. free ; Co. $5 ; others $10.
76	8 28	23 30	25 31	229 19	2,088 58	689 92	Free F. IV $20.
77	1 35	.....	.....	467 45	2,161 13	205 55	Non-res. $10.
78	36 87	.....	50 16	146 86	1,750 14	700 45	$5.
79	24 00	.....	4 05	498 27	2,673 31	26 48	$5.
80	.....	89 09	2 50	378 91	2,690 50	299 68	Free.
81	85 07	4 50	20 25	688 03	3,177 65	109 48	Town, 1st year free ; $6.
82	.....	551 00	56 00	274 06	3,466 18	636 19	$10.
83	.....	.....	.....	628 58	3,257 34	24 40	Res. $; non-res. and Co. $7.50.
84	288 45	.....	.....	807 39	4,245 84	376 05	Res. free.
85	44 97	39 00	54 88	299 16	1,634 31	657 41	Free.
86	.....	130 83	.....	460 13	4,390 92	1,036 34	$10.
87	.....	14 64	40 00	418 51	1,721 15	19 99	Res. $7.50 ; Co. $10 ; others $15.
88	.....	20 23	10 31	145 43	2,125 97	176 96	$5.
89	.....	4 00	14 95	452 05	2,591 00	791 12	Free.
90	.....	19 25	.....	1,267 49	4,011 74	1,050 39	$10.
91	.....	130 48	189 30	583 29	3,823 03	621 22	Free.
92	178 45	11 00	44 34	295 38	2,096 90	77 10	$10.
93	8 00	115 35	.....	479 10	2,952 45	39 39	Res. $5 ; others $10.
94	103 48	.....	106 24	2,923 29	5,672 51	591 62	Free.
1	7,371 28	5,518 08	3,955 89	62,912 72	316,808 48	33,459 50	44 free ; 50 fee.
2	36,875 15	5,910 33	5,610 57	94,123 84	452,871 23	29,713 82	8 free ; 32 fee.
3	44,246 43	11,428 41	9,566 46	157,036 56	769,679 71	63,173 32	52 free ; 82 fee.
4	24,190 84	13,537 47	10,351 41	144,531 39	728,132 52	56,493 17	46 free ; 85 fee.
5	20,055 59	.....	.....	12,505 17	41,547 19	6,680 15	6 free.
6	.....	2,109 06	784 95	.....	.....	.....	3 free.
7	5.75	1.49	1.24	20.40	.....	.....	
.....	.....	.....	.....	.....	.....	.....	

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, Pupils in the

Collegiate Institutes.	Pupils and attendance.				Number of pupils in the						
	Boys.	Girls.	Total.	Average attendance.	Reading.	English Grammar and Rhetoric.	English Composition.	Poetical Literature.	Supplementary Reading in English Literature.	Canadian History.	English History.
1											
2											
3											
4											
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29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
	Totals										

AND HIGH SCHOOLS.—*Continued.*

various subjects and examination results.

various branches of instruction.

	Ancient History.	Geography.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	Physics.	Chemistry.	Botany.	Zoology.	Latin.	Greek.	French.	German.	Writing.
1	78	116	149	155	107	18	91	48	85	1	149	1	78	.....	79
2	146	139	201	239	215	23	187	138	86	5	242	5	145	22	85
3	154	150	338	363	270	35	172	86	147	7	248	15	260	92	166
4	120	163	237	235	235	25	156	55	98	7	222	13	216	75	142
5	123	184	345	290	190	20	197	106	64	4	270	27	204	18	75
6	74	81	157	176	148	17	115	42	81	6	146	9	131	28	56
7	64	96	118	160	160	12	110	64	6	6	12	1	140	35	38
8	88	85	113	123	89	15	87	77	68	8	109	2	55	12	68
9	44	164	189	211	154	10	38	34	101	1	140	5	141	56	99
10	150	127	242	260	153	20	148	72	125	4	135	4	155	30	96
11	102	160	231	232	232	32	145	61	32	5	194	1	183	80	166
12	317	291	489	668	458	106	403	165	376	37	640	10	386	243	211
13	40	60	132	142	141	7	61	31	64	.....	76	1	82	7	84
14	98	360	477	418	310	18	187	85	75	.....	354	10	393	152	189
15	142	108	252	203	169	28	162	82	86	.....	235	12	175	16	108
16	292	582	718	702	376	64	416	202	224	18	614	25	442	73	385
17	123	81	218	234	186	22	145	66	73	3	208	9	203	29	84
18	70	137	237	225	142	23	108	66	80	1	157	1	207	40	97
19	56	141	195	226	121	22	119	38	129	6	164	6	113	17	134
20	140	121	242	225	179	30	179	89	82	12	216	3	189	18	104
21	101	434	466	560	359	49	149	83	74	6	430	38	448	94	201
22	209	209	323	382	265	60	265	157	189	17	332	14	245	30	108
23	58	164	189	201	129	12	89	31	62	..	180	13	131	21	55
24	96	240	290	330	190	20	90	61	146	2	146	1	105	33	146
25	83	166	228	210	153	7	63	64	68	....	219	5	192	19	96
26	85	116	173	144	152	26	130	54	68	11	144	8	62	24	76
27	65	262	287	331	190	19	125	34	136	4	185	12	178	61	193
28	129	107	196	234	229	27	146	35	62	3	226	7	170	41	59
29	151	288	413	326	227	22	248	92	131	5	264	..	156	40	170
30	83	222	268	287	111	14	152	38	139	.....	209	10	153	27	145
31	91	99	187	217	161	25	159	58	61	4	214	6	156	29	76
32	118	89	305	320	255	31	205	104	91	6	242	12	127	94	203
33	50	175	180	185	125	12	125	45	70	5	170	5	110	20	60
34	182	330	499	584	457	69	257	100	232	13	428	30	544	183	213
35	88	308	354	396	306	17	266	62	218	7	324	21	295	82	162
36	269	193	480	542	502	48	323	146	237	31	440	28	378	137	216
37	75	181	216	235	106	17	90	53	54	5	162	5	105	40	109
38	36	92	150	165	120	9	69	21	92	1	163	8	67	14	90
39	68	120	312	239	180	19	110	65	150	10	164	1	150	40	114
40	80	151	260	312	162	15	155	48	76	44	222	12	121	18	101
	4,538	7,290	11,059	11,687	8,417	1,065	6,442	2,968	4,435	305	9,395	416	7,771	2,148	5,053

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, pupils in the

Collegiate Institutes.	Number of pupils in the various branches of instruction.—*Con.*									
	Bookkeeping and Commercial Transactions.	Stenography.	Typewriting.	Drawing.	Vocal Music.	Drill, Calisthenics and Gymnastics.	Agriculture.	Manual Training.	Number passed Junior Leaving Pt. 1 Exam.	Number of Honors obtained by such pupils.
1 Aylmer	79	.....	.....	79	.....	141	.....	.....	8	.....
2 Barrie	84	48	51	85	.....	230	.....	.....	20	1
3 Brantford	192	94	49	166	.....	351	.....	174	15	1
4 Brockville	142	51	65	141	.....	.....	.....	.....	12	.....
5 Chatham	214	75	75	109	.....	345	.....	.....	16	.....
6 Clinton	81	40	6	81	.....	156	.....	.....	9	.....
7 Cobourg	62	60	52	42	.....	140	4	74	19	.....
8 Collingwood	72	41	20	97	.....	174	.....	.....	7	.....
9 Galt	106	59	35	101	.....	222	.....	.....	17	3
10 Goderich	122	42	.....	122	.....	240	.....	.....	12	.....
11 Guelph	160	29	34	160	.....	260	.....	.....	11	.....
12 Hamilton	228	73	20	220	.....	530	.....	.....	38	1
13 Ingersoll	84	27	4	64	.....	136	.....	.....	11	1
14 Kingston	219	95	95	135	.....	.....	.....	115	11	.....
15 Lindsay	108	62	.....	108	.....	245	.....	.....	14	.....
16 London	385	177	59	332	.....	900	.....	260	58	3
17 Morrisburg	92	50	15	124	.....	238	70	.....	14	.....
18 Napanee	162	67	38	146	.....	256	.....	.....	15	.....
19 Niagara Falls	134	75	38	124	.....	200	.....	.....	16	.....
20 Orillia	142	60	75	87	.....	265	.....	.....	25	.....
21 Ottawa	340	112	.....	340	.....	512	.....	.....	9	.....
22 Owen Sound	159	25	19	138	.....	287	.....	.....	22	.....
23 Perth	57	.....	.....	112	.....	198	.....	.....	10	.....
24 Peterborough	146	36	.....	146	.....	320	.....	.....	14	.....
25 Renfrew	96	39	39	57	.....	103	.....	53	28	.....
26 Ridgetown	76	36	22	58	.....	173	.....	.....	15	2
27 St. Catharines	193	121	49	131	.....	301	.....	.....	7	.....
28 St. Mary's	71	41	21	59	.....	209	.....	.....	21	.....
29 St. Thomas	227	108	27	227	.....	413	.....	.....	57	.....
30 Sarnia	145	71	27	145	.....	265	.....	.....	7	.....
31 Seaforth	72	23	27	72	.....	204	.....	.....	24	.....
32 Stratford	150	75	50	203	.....	100	.....	214	14	1
33 Strathroy	65	55	35	60	.....	175	.....	.....	23	1
34 Toronto (Harbord)	321	140	65	267	.....	559	.....	.....	11	.....
35 Toronto (Jameson)	184	85	24	195	.....	332	.....	.....	14	.....
36 Toronto (Jarvis)	236	65	55	256	.....	544	.....	.....	34	.....
37 Toronto Junction	109	50	50	129	.....	.....	.....	.....	11	.....
38 Whitby	90	47	.....	90	.....	152	.....	.....	16	.....
39 Windsor	164	66	66	180	.....	320	.....	.....	15	.....
40 Woodstock	101	16	43	101	.....	230	.....	59	36	.....
Totals	5,870	2,469	1,350	5,489	.....	10,426	74	949	736	14

AND HIGH SCHOOLS.—*Continued.*

various subjects and examination results.—*Continued.*

					Examination Results.										
	Number passed Junior Leaving Pt. II Exam.	Number of Honors obtained by such pupils.	Number passed Commercial Diploma Exam. Parts I and II.	Number passed Commercial Diploma Exam. Part II.	Number passed Senior Leaving Pt. I Exam.	Number of Honors obtained by such pupils.	Number passed Senior Leaving Pt. II Exam.	Number of Honors obtained by such pupils.	Number passed Departmental Matriculation Exam.	Number passed the Junior Matriculation Exam. held by any University.	Number of first-class Junior Matriculation Honors taken by pupils.	Number of second-class Junior Matriculation Honors taken by pupils.	Number passed the Senior Matriculation Exam. held by any University.	Number passed the Entrance Examination other than the Departmental, for any profession.
1	11	.....	.....	.....	6	.....	1	.....	10	2	5	3	.....	.....
2	26	.....	1	.....	4	.....	5	1	15	.....	.....	.....	.....	12
3	20	.....	4	13	5	.....	4	.....	16	7	8	25	3	5
4	21	.....	.....	.....	1	.....	2	.....	10	12	2	.....	.....	6
5	14	2	.....	8	5	.....	4	.....	4	.....	3	9	.....	.....
6	21	.....	2	.....	4	1	3	1	4	.....	7	9	.....	3
7	6	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....
8	10	.....	1	6	.....	.....	2	.....	4	6	1	1	.....	4
9	5	.....	.....	5	3	.....	3	.....	10	.....	.....	.....	.....	.....
10	18	.....	.....	.....	5	.....	2	.....	3	2	.....	.....	.....	.....
11	8	.....	.....	7	6	.....	8	.....	4	.....	8	13	.....	2
12	27	.....	.....	.....	38	2	17	1	54	58	40	53	.....	4
13	6	1	.....	.....	.....	.....	.....	.....	3	.....	4	1	.....	.....
14	10	1	.....	7	2	.....	1	.....	17	5	.....	.....	5	8
15	23	.....	3	3	4	2	3	2	10	.....	.....	.....	4	.....
16	35	.....	5	9	13	.....	5	.....	27	.....	16	3	1	.....
17	25	.....	.....	1	1	.....	2	.....	3	.....	.....	.....	.....	.....
18	20	2	.....	.....	11	.....	6	.....	8	.....	.....	.....	.....	12
19	14	.....	2	6	3	.....	3	.....	3	.....	.....	.....	.....	.....
20	24	.....	2	4	5	.....	6	.....	5	.....	5	3	.....	12
21	8	.....	.....	.....	7	1	3	2	19	31	2	6	.....	.....
22	40	.....	.....	.....	21	2	15	2	29	.....	55	17	.....	.....
23	14	.....	.....	.....	2	.....	4	.....	6	5	3	4	2	12
24	12	1	.....	.....	4	.....	3	.....	29	.....	3	3	1	.....
25	14	.....	.....	.....	.....	.....	.....	.....	4	.....	2	.....	.....	.....
26	16	.....	2	2	2	3	4	2	12	.....	4	6	.....	3
27	7	.....	.....	8	1	.....	1	.....	.....	9	3	.....	.....	7
28	15	.....	.....	.....	10	1	9	1	7	2	18	34	.....	.....
29	20	.....	.....	.....	5	.....	3	.....	5	.....	.....	.....	.....	1
30	12	.....	.....	.....	3	.....	2	.....	5	4	8	13	.....	.....
31	15	.....	1	1	8	.....	5	1	10	.....	1	1	.....	.....
32	14	.....	.....	.....	6	.....	4	.....	7	4	9	1	.....	.....
33	11	.....	.....	.....	4	.....	2	1	8	2	4	4	.....	.....
34	13	1	.....	4	2	.....	3	.....	27	.....	38	14	.....	.....
35	8	.....	.....	.....	3	1	1	1	53	.....	30	2	.....	.....
36	18	2	.....	.....	3	.....	1	.....	22	8	20	17	.....	.....
37	19	2	.....	.....	4	.....	2	2	9	5	26	2	.....	.....
38	11	1	.....	.....	4	.....	5	1	1	1	.....	.....	.....	1
39	7	.....	.....	5	.....	.....	2	.....	8	.....	.....	1	.....	1
40	18	.....	.....	.....	3	.....	4	.....	9	.....	1	3	.....	.....
	636	13	23	89	208	13	150	18	483	163	326	248	16	55

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, Pupils in the

High Schools	Pupils and Attendance.				Number of pupils			
	Boys.	Girls.	Total.	Average attendance.	Reading.	English Grammar and Rhetoric.	English Composition.	Poetical Literature.
1 Alexandria	50	72	122		112	122	102	113
2 Almonte	70	68	138	73	107	122	103	103
3 Arnprior	62	78	140	74	140	140	13	13
4 Arthur	60	55	115	68	73	80	110	12
5 Athens	93	114	207	1	190	172		17
6 Aurora	48	48	96		86			
7 Beamsville	45	31	76	42	63	76		74
8 Belleville	83	107				93	10	
9 Berlin	89	92	181	1	1	1	1	1
10 Bowmanville	63	58	121	70		93	11	12
11 Bradford	52	57	109					10
12 Brampton	67	78	145	84		96		14
13 Brighton	54	46	80		37	70	80	
14 Caledonia	52	56	108	56	81	105		10
15 Campbellford	92	72	164	79	88	128		
16 Carleton Place	55	82	137	82	109	74		13
17 Cayuga	42	49	91	51		84		
18 Colborne	33	34	67	39		67		
19 Cornwall	108	119	227	130	123	20		
20 Deseronto	57	57	114	74		111		11
21 Dundas	93	37	130			122		
22 Dunnville	68	72	139	82	90	139	10	13
23 Dutton	80	106	186	111	82	180		10
24 Elora	57	63	110	69	79	110	13	10
25 Essex	99	72	171	93	74	102	13	9
26 Fergus	91	67	121	65	52	121		9
27 Forest	99	86	185	71	83	142		
28 Fort William	21	39	60	34	42	5		
29 Gananoque	41	83	127	70	1	13		
30 Georgetown	47	58	105	61	73	5	10	
31 Glencoe	46	52	98	61	68	8	11	11
32 Gravenhurst	33	42	75	43	1	61		
33 Grimsby	20	19	39	25	1	6		
34 Hagersville	45	47	92	54	1	8		
35 Harriston	48	48	96	57	1	1		
36 Hawkesbury	39	49	88	47	46	1		
37 Iroquois	69	66	135	87	116	128		
38 Kemptville	98	90	201	120	78	13	11	
39 Kincardine	71	87	161	90	16	16	11	
40 Leamington	67	61	128	73	61	107	13	
41 Listowel	75	69	144	86	124	110	11	
42 Lucan	71	74	145	86	79	124	11	
43 Mardoc	39	43	82	44	39	88	11	
44 Markham	106	81	187	110	91	108	11	10
45 Meaford	71	77	148	87	1	116	1	
46 Mitchell	74	74	148	87	1	118	1	14
47 Mount Forest	87	84	171	103	87	134	12	
48 Needham	29	30	59	37	1	12	1	
49 Newcastle	90	94	184	94	1	90	13	11
50 Newmarket	87	87	174	103	87	111	13	
51 Niagara	58	56	114	67	1	54	1	
52 Niagara Falls South	66	58	124	76	1	7	1	
53 North Bay	46	45	91	56	1	10	1	
54 Norwood	68	64	132	78	120	130	12	
55 Orangeville	57	61	118	71	1	56	1	

AND HIGH SCHOOLS.—*Continued.*

various subjects and examination results.—*Continued.*

in the various branches of instruction.

	Supplementary Reading in English Literature.	Canadian History.	English History.	Ancient History.	Geography.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	Physics.	Chemistry
1	142	142	64	41	100	142	142	61	.....	14	...
2	133	107	109	33	109	121	132	59	2	8	17
3	140	127	129	35	127	138	140	81	.....	22	...
4	115	63	44	37	79	110	115	80	5	26	32
5	176	70	70	118	67	172	177	139	3	125	108
6	96	67	75	29	67	88	96	65	2	15	21
7	74	64	64	14	60	74	74	33	.....	32	...
8	243	234	234	53	141	253	290	160	21	145	60
9	189	153	153	58	130	163	189	96	7	76	35
10	121	74	74	32	75	100	113	69	11	4	...
11	80	81	84	42	81	108	109	80	3	41	...
12	185	126	126	59	126	165	180	180	15	6	36
13	80	41	41	39	41	80	80	80	.....	6	39
14	89	80	105	47	89	98	105	105	5	77	21
15	42	88	88	46	88	130	130	73	4	7	4
16	141	32	110	37	101	143	143	109	12	7	2
17	91	56	56	28	56	84	91	91	7	61	17
18	67	38	38	24	38	67	67	29	.....	33	...
19	225	186	75	52	179	209	219	147	10	97	12
20	73	73	73	41	73	111	114	114	.....	7	14
21	130	101	101	51	101	130	130	80	3	7	...
22	130	90	95	40	96	125	128	85	1	84	19
23	195	80	90	86	60	162	190	190	3	165	165
24	110	22	84	43	79	102	108	73	6	41	3
25	114	49	49	65	49	102	114	66	12	6	33
26	121	63	63	48	63	112	121	121	9	30	3
27	80	83	83	55	83	112	115	115	.....	7	3
28	21	9	50	10	46	53	52	52	1	23	4
29	127	64	104	35	104	118	125	83	3	8	4
30	102	73	81	41	73	97	104	104	9	14	21
31	88	52	56	39	53	81	87	86	4	60	22
32	75	43	75	32	43	63	75	54	4	25	...
33	68	52	52	19	55	63	65	36	.....	31	...
34	90	63	67	38	63	82	82	56	4	7	...
35	128	54	68	60	54	117	100	98	11	53	45
36	.....	52	60	32	42	63	79	43	10	42	11
37	133	94	99	57	94	129	133	83	7	43	13
38	195	73	89	106	73	195	20	164	16	16	...
39	161	92	116	69	108	153	133	96	10	7	...
40	128	64	74	64	56	107	128	83	10	13	45
41	159	111	111	59	159	149	159	159	3	72	...
42	147	79	63	68	79	125	146	110	21	13	13
43	91	44	44	43	44	91	91	89	2	4	...
44	216	111	120	102	109	178	217	215	19	7	104
45	125	69	69	50	69	119	137	137	20	13	44
46	116	93	93	55	91	116	116	116	.....	11	...
47	168	87	101	81	87	143	168	168	17	112	...
48	135	79	79	56	79	125	135	135	.....	7	20
49	48	36	36	32	36	40	48	48	.....	7	7
50	113	80	80	31	80	113	108	79	.....	7	7
51	.....	27	38	8	38	44	44	25	.....	7	...
52	75	63	63	16	63	75	75	75	.....	7	...
53	54	31	31	23	31	50	54	54	.....	7	...
54	129	110	110	44	110	129	120	89	.....	87	...
55	76	56	56	18	56	76	76	62	.....	7	...

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, Pupils in the

Number of pupils in the various branches of instruction.—*Con.*

High Schools.	Botany.	Zoology.	Latin.	Greek.	French.	German.	Writing.	Bookkeeping and Commercial Transactions.	Stenography.	Typewriting.	Drawing.	Vocal Music.
1 Alexandria	101		132		140		100	100			100	
2 Almonte	58	1	87	3	56	6	57	90	65	46	88	
3 Arnprior	69		130	6	73	3	69	69			69	
4 Arthur	63		115		16	1	63	63	44		44	
5 Athens	67		176	5	90		86	67			93	
6 Aurora	67		80	4	75	8	67	67	31	31	31	
7 Beamsville	40		50		51		41	40			41	
8 Belleville	196	5	204	3	160	8	192	192			213	
9 Berlin	55	1	105	3	40	140	132	132	35	20	136	
10 Bowmanville	59		100	2	52	8	59	61	28		59	
11 Bradford	49		102		79	1	49	91	68		81	
12 Brampton	131	5	160	6	135	12	44	84	28		84	
13 Brighton			74		31		29	29			29	
14 Caledonia	61		100		33	7	61	61			61	
15 Campbellford	55		110		18	1	61	61			71	
16 Carleton Place	75		139	5	105	7	38	61			75	
17 Cayuga	30		74		50	5	30	30	14		30	
18 Colborne	28		67		32	10	28	28			28	
19 Cornwall	93		174	25	187	9	138	138	30		103	138
20 Deseronto	67		99		36	20	73	73			73	
21 Dundas	79		120	2	115	5	79	79			79	
22 Dunnville	54		119	1	77	20	70	85	19		70	
23 Dutton	34	7	190	4	26		82	44			44	
24 Elora	62		104		39	12	30	20			62	
25 Essex	53	4	70	8	35	14	49	50			49	
26 Fergus			115	4	110	6	26	26			26	
27 Forest	49		112	3	37	15	49	49			49	
28 Fort William			32		32	1	34	39	30		36	
29 Gananoque	16		81		74		64	64			64	
30 Georgetown	43		100	2	31	6	43	43			43	
31 Glencoe	34		82		64	4	35	35			34	
32 Gravenhurst	43		45		7	1	19	43	12		19	
33 Grimsby	29		43		29		41	41			41	
34 Hagersville	49		72		58	13	32	50			50	
35 Harriston	14		72	6	44	22	21	26	15	35	21	
36 Hawkesbury	42		62		77	8	42	42			42	
37 Iroquois	75	3	103	1	72	4	73	73	27		73	
38 Kemptville	65	1	195	8	95	7	73	73			73	
39 Kincardine	90		120	5	117	28	92	92	37	36	92	
40 Leamington	34		98		59	1	39	39			39	
41 Listowel	35		129	4	59	75	35	40			40	
42 Lucan	53	11	139		55	40	37	39	10	2	37	
43 Madoc	26		85		26	10	26	26			26	
44 Markham	52	6	211	4	167	6	46	46	52		46	
45 Meaford	44	3	136		89	38	38	42	12	26	38	
46 Mitchell	61		77		57		61	61			61	
47 Mount Forest	87		159	2	76	11	87	87			87	
48 Newburgh	79		118		75		79	79	40		79	
49 Newcastle	16		37		43	6	24	20			24	
50 Newmarket	34		49	1	52	7	34	42	35	41	36	
51 Niagara	11		32		21	2	23	31	18	22	23	
52 Niagara Falls South	42		68		15	2	42	47	37		42	
53 North Bay	19		54		54		31	40	42		19	
54 Norwood	45		120		39	10	70	61			54	
55 Oakville	56		52		17		39	56			56	

AND HIGH SCHOOLS—*Continued.*

various subjects and examination results.—*Continued.*

| | Drill, Calisthenics and Gymnastics. | Agriculture. | Manual training. | Examination Results. | | |

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, Pupils in the

High Schools.	Pupils in attendance.							Number of Pupils
	Boys.	Girls.	Total.	Average attendance.	Reading.	English Grammar and Rhetoric	English Composition	Political Education
[illegible]	[illegible]	40	73	40	[illegible]	72	[illegible]	[illegible]
[illegible]	118	108	226	129	[illegible]	190	219	[illegible]
[illegible]	108	93	201	113	167	177	201	[illegible]
[illegible]	[illegible]	56	112	68	[illegible]	[illegible]	112	112
[illegible]	71	[illegible]	124	79	68	110	124	124
[illegible]	102	65	167	95	[illegible]	149	167	[illegible]
[illegible]	62	85	147	99	144	142	147	[illegible]
[illegible]	103	132	235	136	148	191	231	[illegible]
[illegible]	27	[illegible]	77	42	77	77	77	[illegible]
[illegible]	43	[illegible]	85	50	52	85	85	[illegible]
Port Elgin	56	[illegible]	[illegible]	[illegible]	80	98	98	[illegible]
[illegible]	98	96	194	110	115	[illegible]	194	[illegible]
[illegible]	47	[illegible]	106	[illegible]	106	101	102	[illegible]
[illegible]	33	22	55	27	36	55	55	[illegible]
[illegible]	35	[illegible]	91	[illegible]	[illegible]	[illegible]	91	[illegible]
[illegible]	50	[illegible]	84	49	42	[illegible]	84	84
[illegible]	[illegible]	34	80	45	80	74	80	[illegible]
[illegible]	47	67	114	63	89	110	114	114
[illegible]	90	92	182	97	102	168	182	182
[illegible]	62	113	175	106	175	170	175	[illegible]
[illegible]	45	55	100	[illegible]	56	94	98	98
[illegible]	25	36	61	40	[illegible]	58	61	62
[illegible]	28	28	[illegible]	30	44	56	[illegible]	[illegible]
[illegible]	69	97	166	83	111	[illegible]	166	[illegible]
[illegible]	19	61	80	64	51	73	79	[illegible]
[illegible]	48	62	110	62	72	[illegible]	110	[illegible]
[illegible]	49	52	101	59	62	96	101	[illegible]
[illegible]	47	[illegible]	106	57	78	[illegible]	106	[illegible]
[illegible]	82	111	193	118	112	186	192	[illegible]
[illegible]	19	23	42	[illegible]	[illegible]	[illegible]	42	[illegible]
[illegible]	81	77	[illegible]	94	89	[illegible]	158	[illegible]
[illegible]	28	17	45	25	23	[illegible]	45	[illegible]
[illegible]	38	36	74	41	[illegible]	59	67	67
[illegible]	[illegible]	47	101	59	82	90	100	[illegible]
Watford	72	[illegible]	[illegible]	[illegible]	[illegible]	59	168	[illegible]
[illegible]	80	[illegible]	192	114	94	[illegible]	192	[illegible]
[illegible]	22	42	64	32	42	[illegible]	63	64
Wiarton	[illegible]	45	91	[illegible]	55	[illegible]	90	[illegible]
[illegible]	51	68	119	68	91	119	119	119
1 Totals, High Schools	5,452	6,059	11,511	6,733	8,047	10,480	11,441	11,288
2 Totals, Collegiate Institutes	6,177	6,784	12,961	7,697	8,494	11,096	12,800	12,480
4 Grand Totals, 1902	11,629	12,843	24,472	14,430	16,541	21,576	24,241	23,768
4 [illegible]	10,869	11,654	22,523	13,224	15,574	19,401	22,126	[illegible]
5 [illegible]	760	1,189	[illegible]	1,206	967	2,175	2,115	1,780
6 [illegible]								
7 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	99	[illegible]

AND HIGH SCHOOLS.—*Continued.*

various subjects, and examination results.—*Continued.*

in the various branches of instruction.

	Supplementary Reading in English Literature.	Canadian History.	English History.	Ancient History.	Geography.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	Physics.	Chemistry.
	73	29	51	22	29	73	73	44	.....	39	27
	223	104	118	147	76	190	219	217	19	163	134
	201	167	172	53	167	185	201	107	24	107	2[illegible]
	82	82	83	30	65	82	112	54	5	34	2[illegible]
	56	68	68	56	68	110	124	123	10	45	44
	167	137	143	44	111	149	167	121	6	56	35
	147	72	105	70	72	142	147	104	3	102	10
	147	166	116	79	180	232	199	173	15	86	50
	77	60	60	17	77	77	77	42	1	21	17
	52	52	52	33	52	85	85	61	.....	57	3[illegible]
	98	80	80	38	80	97	97	97	.....	58	1[illegible]
	194	97	116	75	97	168	174	84	19	52	2[illegible]
	106	75	80	45	75	98	102	83	12	73	7[illegible]
	.....	36	36	19	36	53	55	19	.....	18	[illegible]
	91	54	54	37	36	86	91	60	6	45	3[illegible]
	84	63	63	37	47	79	84	62	.....	41	3[illegible]
	80	52	52	28	52	75	80	50	.....	50	2[illegible]
	114	89	89	25	64	102	114	50	1	70	2[illegible]
	182	102	116	80	102	135	162	140	14	90	1[illegible]
	175	123	175	52	164	170	175	100	11	100	1[illegible]
	.....	56	60	44	56	95	99	67	[illegible]	68	1[illegible]
	58	29	29	31	29	58	62	42	3	42	[illegible]
	56	44	44	18	44	55	56	29	.....	29	[illegible]
	166	111	111	55	111	156	166	[illegible]	[illegible]	93	1[illegible]
	79	51	60	29	51	73	79	79	7	51	[illegible]
	105	72	72	38	50	98	110	[illegible]	.....	54	5[illegible]
	101	62	96	39	32	86	100	100	2	[illegible]	[illegible]
	106	78	83	28	72	96	102	60	3	57	[illegible]
	192	87	112	81	73	183	192	156	9	121	4[illegible]
	42	27	27	12	27	42	42	42	.....	42	2[illegible]
	158	89	121	69	53	142	158	127	30	118	3[illegible]
	45	30	30	22	30	45	45	[illegible]	.....	30	1[illegible]
	67	39	39	26	39	55	72	50	.....	42	1[illegible]
	100	82	82	28	82	90	100	61	8	58	2[illegible]
	101	50	62	113	163	150	163	113	12	113	8[illegible]
	163	81	155	33	91	172	191	138	15	95	3[illegible]
	64	45	28	20	45	64	64	38	1	29	[illegible]
	90	55	56	36	55	87	91	61	2	64	1[illegible]
	119	91	91	28	91	119	119	90	.....	44	[illegible]
1	10,531	7,088	7,651	4,253	7,210	10,535	11,266	8,464	597	6,316	2,892
2	12,401	7,680	9,166	4,538	7,290	11,059	11,687	8,417	1,065	6,442	2,468
3	22,932	14,768	16,817	8,791	14,500	21,594	22,953	16,881	1,662	12,758	5,360
4	20,828	14,097	16,008	7,939	13,790	19,471	21,413	15,992	1,567	11,735	5,162
5	2,104	671	809	852	710	2,123	1,540	889	95	1,023	329
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	91	60	69	36	59	88	94	69	7	52	24

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, Pupils in the

Number of pupils in the various branches of instruc

High Schools.	Botany.	Zoology.	Latin.	Greek.	French.	German.	Writing.	Bookkeeping and Commercial Transactions.	Stenography.	Typewriting.	Drawing.	Vocal Music.
56 Omemee	33	....	54	4	33	.....	29	29	.....	.....	29	....
57 Orangeville	76	3	207	11	97	21	75	75	.....	.....	75	....
58 Oshawa	46	....	154	7	110	55	167	167	51	92	148	....
59 Paris	54	1	75	3	50	20	58	60	.....	.....	58	....
60 Parkhill	32	2	122	7	65	5	68	68	60	.....	68	....
61 Pembroke	70	....	129	.....	88	9	80	109	.....	.....	109	....
62 Petrolea	44	....	122	.....	93	.....	49	49	.....	.....	49	....
63 Picton	67	....	184	.....	198	41	70	107	47	50	102	....
64 Port Arthur	35	....	67	.....	36	.....	35	35	.....	.....	35	....
65 Port Dover	24	....	80	4	27	11	24	24	.....	.....	24	....
66 Port Elgin	59	....	89	1	45	4	39	55	.....	.....	55	....
67 Port Hope	40	....	137	6	67	21	72	93	87	76	72	....
68 Port Perry	16	....	93	8	65	5	66	66	42	42	47	....
69 Port Rowan	36	....	23	1	20	.....	36	36	12	.....	36	....
70 Prescott	29	....	64	.....	45	.....	31	36	35	36	30	....
71 Rat Portage	47	....	62	.....	55	.....	22	47	.....	.....	47	....
72 Richmond Hill	29	....	78	6	26	12	16	45	11	13	45	....
73 Sault Ste. Marie	65	....	99	.....	100	.....	40	81	.....	.....	64	....
74 Simcoe	45	....	125	4	70	25	55	45	10	.....	45	....
75 Smith's Falls	123	1	162	6	115	23	123	123	25	29	123	....
76 Smithville	37	3	83	.....	28	9	37	37	16	.....	32	....
77 Stirling	29	....	36	.....	15	.....	29	29	.....	.....	29	....
78 Streetsville	42	....	55	.....	29	.....	44	44	.....	.....	44	....
79 Sydenham	54	....	130	.....	48	21	58	111	.....	.....	111	....
80 Thorold	30	....	60	1	43	2	51	49	43	35	22	....
81 Tillsonburg	26	....	82	.....	45	.....	44	35	.....	.....	32	....
82 Trenton	.....	.....	77	.....	46	11	.....	.....	12	.....	.....	....
83 Uxbridge	19	....	65	.....	52	33	46	50	34	.....	46	....
84 Vankleekhill	72	....	176	2	127	.....	72	60	24	25	70	....
85 Vienna	27	....	40	.....	6	.....	27	27	.....	.....	27	....
86 Walkerton	48	3	145	11	70	78	31	64	.....	.....	64	....
87 Wardsville	23	....	40	.....	9	2	23	23	.....	.....	23	....
88 Waterdown	18	....	56	.....	54	.....	19	19	.....	.....	19	....
89 Waterford	52	....	75	1	30	15	72	70	.....	.....	70	....
90 Watford	50	....	163	.....	13	12	50	50	.....	.....	50	....
91 Welland	94	....	187	4	172	24	54	88	.....	.....	83	....
92 Weston	23	....	47	.....	25	7	29	38	20	37	23	....
93 Wiarton	27	....	52	2	33	4	27	27	.....	.....	27	....
94 Williamstown	26	....	115	6	71	42	26	26	.....	.....	26	....
1 Totals, High Schools	4,616	60	9,489	215	5,824	1,132	5,006	5,464	1,258	694	5,232	138
2 Totals, Coll. Institutes	4,435	305	9,395	416	7,771	2,148	5,053	5,870	2,469	1,350	5,489	....
3 Grand Totals, 1902	9,051	365	18,884	631	13,595	3,280	10,059	11,334	3,727	2,044	10,721	138
4 Grand Totals, 1901	8,256	309	19,029	672	13,024	3,065	8,653	10,051	3,191	1,666	9,720	248
5 Increases	795	56	.....	.....	571	115	1,406	1,283	536	378	1,001	....
6 Decreases	.....	....	145	41	.....	.....	.....	.....	.....	.....	.....	110
7 Percentages	37	1.5	77	2.6	55	13	41	46	15	8	44	.56

AND HIGH SCHOOLS.—*Continued.*

various subjects, and examination results.—*Concluded.*

tion.—*Con.*

Examination results.

	Drill, Calisthenics and Gymnastics.	Agriculture.	Manual training.	No. passed Junior Leaving Part I. Exam.	No. of Honors obtained by such pupils.	No. passed Junior Leaving Part II. Exam.	No. of Honors obtained by such pupils.	No. passed Commercial Diploma Exam. Parts I. and II.	No. passed Commercial Diploma Exam. Part II.	No. passed Senior Leaving Part I. Exam.	No. of Honors obtained by such pupils.	No. passed Senior Leaving Part II. Exam.	No. of Honors obtained by such pupils.	No. passed Departmental Matriculation Exam.	No. passed Junior Matriculation held by any University.	No. of first-class Junior Matriculation Honors taken by pupils.	No. of Second-class Junior Matric. Honors taken by pupils.	No. passed Senior Matriculation Exam. held by any University.	No. passed Entrance Exam. other than Departmental, for any profession.
56	.....	.....	.....	5	....	2	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
57	.....	.....	.....	16	....	23	1	.....	.....	1	.....	.....	.....	13	2	.....	.....	.....	.....
58	.....	.....	.....	17	2	11	.....	.....	.....	6	....	6	....	5	.....	.....	.....	1	.....
59	.....	.....	.....	8	....	1	.....	.....	.....	.....	.....	2	....	2	.....	.....	.....	.....	.....
60	31	.....	.....	18	1	10	.....	.....	.....	3	....	1	....	8	.....	.....	.....	.....	.....
61	117	.....	.....	5	....	11	.....	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....
62	61	.....	.....	8	....	2	.....	.....	.....	2	.....	.....	.....	15	5	1	4	.....	.....
63	.....	.....	.....	19	....	21	.....	.....	.....	2	....	3	....	8	.....	.....	.....	.....	.....
64	.....	.....	.....	3	....	4	.....	.....	.....	.....	.....	.....	.....	7	1	.....	.....	.....	1
65	.....	.....	.....	8	....	8	.....	.....	.....	.....	.....	.....	.....	3	5	.....	.....	.....	.....
66	.....	.....	.....	12	....	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
67	.....	.....	.....	13	1	14	1	.....	.....	2	....	5	....	3	.....	2	3	.....	.....
68	106	.....	.....	5	....	7	.....	.....	.....	.....	.....	.....	.....	2	3	.....	.....	.....	3
69	.....	.....	.....	1	....	5	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
70	.....	.....	.....	4	....	7	1	.....	.....	1	.....	.....	.....	2	.....	.....	.....	.....	1
71	62	.....	.....	5	....	3	1	.....	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....
72	.....	.....	.....	5	....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
73	.....	.....	.....	8	....	5	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....
74	45	.....	.....	14	2	11	1	.....	.....	2	....	2	....	14	.....	.....	.....	.....	.....
75	.....	.....	.....	15	1	14	2	.....	.....	5	1	2	1	6	.....	.....	.....	1	.....
76	.....	.....	11	10	....	10	.....	.....	.....	1	....	1	....	1	.....	.....	.....	.....	.....
77	.....	.....	.....	7	....	6	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
78	.....	.....	.....	4	....	3	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
79	69	.....	.....	13	....	8	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....
80	.....	.....	.....	5	....	5	.....	.....	.....	1	....	.....	.....	3	1	.....	.....	.....	1
81	.....	.....	.....	8	....	11	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	.....
82	.....	.....	.....	7	....	3	.....	.....	.....	.....	.....	.....	.....	11	.....	.....	.....	.....	.....
83	106	.....	.....	8	....	5	.....	.....	.....	1	....	1	....	5	.....	.....	.....	.....	.....
84	182	.....	.....	16	....	13	.....	.....	.....	1	....	3	....	2	.....	.....	.....	.....	.....
85	12	.....	.....	3	....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
86	.....	.....	.....	14	1	16	.....	.....	.....	3	....	3	....	7	.....	.....	.....	.....	6
87	.....	.....	.....	3	....	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
88	.....	.....	.....	4	....	3	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
89	.....	.....	.....	9	....	9	.....	.....	.....	3	....	3	....	6	.....	.....	.....	.....	.....
90	.....	.....	.....	17	1	15	.....	.....	.....	2	....	2	....	.....	.....	.....	.....	.....	.....
91	.....	.....	.....	4	....	9	.....	.....	.....	2	....	2	....	8	.....	.....	.....	.....	.....
92	.....	.....	.....	4	....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
93	.....	.....	.....	12	....	5	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....
94	.....	.....	.....	8	....	4	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
1	2,341	166	11	937	13	831	16	3	3	108	1	95	5	367	28	24	18	14	32
2	10,426	74	949	736	14	636	13	23	89	208	13	150	18	483	163	326	248	16	55
3	12,767	240	960	1,673	27	1,467	29	26	92	316	14	245	23	850	191	350	266	30	77
4	12,428	150	254	1,995	130	1,487	21	15	38	306	15	225	13	912	176	288	222	42	90
5	339	90	706	.....	.....	.....	8	11	54	10	....	20	10	.....	15	62	44	.....	.....
6	.....	.....	.....	322	103	20	.....	.....	.....	.....	1	.....	.....	62	.....	.....	.....	12	13
7	52	1	3	7	....	6	.1	.1	.4	1.3	....	1	....	3.8	.8	1.4	1	.1	.3

COLLEGIATE INSTITUTES

III. Table K. Miscellaneous

Collegiate Institutes.	Brick, stone or frame school house.	Number of acres in playground.	Schools under United Board.	Equipment.									Religious exer			
				Value of Library (not including Supplementary Reading in English Literature.)	Value of Supplementary Reading in English Literature.	Value of Scientific Apparatus.	Value of Charts, Maps and Globes.	Value of Models for drawing.	Value of Gymnasium (not including Equipment.)	Value of Appliances for Physical Education.	Value of Museum of Natural History, etc.	Value of School Buildings, Grounds and Furniture not included in preceeding items.	Schools using authorized Scripture Read'g.	Schools opened with Prayer.	Schools closed with Prayer.	Schools using Bibles.
				$	$	$	$	$	$	$	$	$				
1 Aurora	B	1½		614	19	697	140	36	680	85	300	15,000		1		
2 Barrie	B	3		612		703	136	5	1,730	90		8,238		1	1	
3 Brantford	B	1½		615	18	891	108	27	1,000	128		18,000		1		1
4 Brockville	S	2½		705	76	1,017	181	10		299		25,770	1	1		1
5 Chatham	B	1½		733		1,379	167	10	600	146	50	30,000	1	1		1
6 Clinton	B	3½		680		817	125	5	765	*	21	9,500	1	1		1
7 Cobourg	B	1		605	66	723	109		*			28,000	1	1	1	1
8 Collingwood	B	½		587	31	656	82	6	1,200	29		15,000		1	1	
9 Cornwall	S	2½		1,066		1,061	67	9	1,200	231	27	20,000	1	1		
10 Goderich	B	1½		646	21	658	71		2,000	200		16,080	1	1		
11 Guelph	S	4		939	31	829	113	12	2,500	557	50	15,000		1		
12 Hamilton	B	3½	1	1,002		1,480	164		*	909	50	156,919	1	1		1
13 Ingersoll	B	2	1	500	80	804	121	4	811	231		15,000	1	1		
14 Kingston	B	1	1	674	108	649	75	25			100	35,000	1	1		1
15 Lindsay	B	1	1	1,725	98	1,010	140	10	600	126	40	31,000		1		
16 London	S	1	1	889		2,780	317	40	*	298	700	80,000		1		
17 Napanee	B	1		657	52	1,254	132	17	986	188	130	12,400	1	1		
18 Owen Sound	B	1½		776	74	931	126		800	252		26,000		1		1
19 Niagara Falls	B	1½		653	78	618	87		1,668	118		25,000		1	1	1
20 Orillia	B	2		670	39	768	110	6	1,800	278		19,000		1		1
21 Ottawa	S	4		3,179	84	1,425	271	150	2,040	184	100	100,000	1	1	1	1
22 Owen Sound	B	1	1	1,299	48	1,798	122	20		25	50	20,000*		1	1	
23 Perth	B	4	1	778	33	846	155	10	560	267	500	26,000	1	1		
24 Peterborough	B	11	1	613	15	886	149	25	600	160				1	1	
25 Renfrew	B	2		504	46	450	80	12				11,000	1	1		
26 Whitby	B	1½		604	10	1,094	139	48	900	96	10	10,000		1	1	
27 St. Catharines	B	½		681		815	133	18	700	75	20	20,000	1			
28 St. Marys	B	2		647	19	626	120	25	700	84		16,000		1	1	
29 St. Thomas	B	2½	1	815	55	916	119	18	983	374		20,000		1		
30 Seaforth	B	1½	1	717		762	127	12	1,380	168		44,000		1		
31 Smith's Falls	B	1½		762		731	138	5	600	66		15,000	1	1		
32 Stratford	B	8		935		1,146	220	26		117		40,000		1		
33 Strathroy	B	1½		715	212	906	114	28	380	112		10,000	1	1		
34 Toronto (Harbord)	B	14		949	202	2,085	174	23	4,000	710		88,500		1		
35 Toronto (Jameson)	B	14		1,421	192	2,225	155	15	4,000	790		62,000	1	1		1
36 Toronto (Jarvis)	B	14		1,356		1,176	268	39	8,257	643	50	56,000	1	1		1
37 Toronto Junction	B	3		673	11	965	107	32				41,500	1	1		
38 Whitby	B	1	1	637		516	110	18	850	209		10,000		1		1
39 Windsor	B	2	1	829		973	140	35	3,000	200	200	14,000				
40 Woodstock	B	1½		986	37	1,405	154	15	2,000	174	70	15,000	1	1	1	
Totals	B 36 S 4	95½	16	51,118	1,961	41,502	5,481	850	48,679	8,687	2,438	1,216,091	23	39	11	14

* Gymnasium is part of the main building.

AND HIGH SCHOOLS.—*Continued.*

Information.

& other cises.	Religious instruction imparted.	Commencement exercises.	Number of pupils in— Form I.	Form II.	Form III.	Form IV.	Number of pupils from— Municipalities composing the High School District.	Municipalities within the County.	Other counties.	Destination of pupils. Number who entered Mercantile life.	Number who became occupied with Agriculture.	Number who entered the professions of Law, Medicine and the Church.	Number who became teachers.	Number who entered any other profession.	Number who left for other occupations.	Occupation of parents. Commerce	Agricultural.	Mechanical Occupations.	Professions.	Without occupation.
1..	1		56	40	47	18	72	87	2	7	5	....	8	3	8	28	86	31	16	.....
2..	....		55	64	122	25	127	134	5	8	3	5	31	....	4	70	99	57	27	13
3..	1		90	130	118	38	281	86	6	27	10	5	12	7	12	110	83	147	36	.....
4..	1		104	50	93	37	199	81	4	10	3	6	21	3	29	70	67	113	19	15
5..	1		109	183	53	20	253	109	3	22	3	5	14	2	4	142	99	92	32	.....
6..	1		65	41	56	20	81	96	5	10	3	3	19	3	11	39	65	43	16	19
7..	....		38	58	52	12	118	32	....	20	4	1	10	....	5	39	40	75	5	1
8..	....		45	62	73	17	115	47	25	16	3	2	14	7	13	68	66	41	9	3
9..	1		66	128	33	11	138	85	15	22	4	4	17	5	18	23	61	105	9	40
10..	1		107	64	85	18	181	82	1	13	1	1	8	5	20	96	41	64	22	39
11..	1		58	102	70	32	210	43	9	22	18	20	43	8	30	260	89	175	86	97
12..	1		212	139	216	140	583	76	48	75	8	1	4	....	30	44	46	35	11	8
13..	1		48	51	37	8	85	50	9	7	8	6	8	8	61	184	75	154	73	25
14..	....		356	47	99	19	443	69	9	21	5	2	23	11	31	84	83	44	37	32
15..	1		60	68	114	28	164	91	15	22	5	17	27	11	132	347	109	258	74	122
16..	....		326	256	235	93	742	143	25	80	4	1	20	5	1	25	101	41	13	58
17..	1		56	59	97	26	92	141	5	12	17	2	16	6	15	76	102	45	25	25
18..	1		112	83	50	28	152	112	9	12	6	4	4	6	32	70	63	43	19	31
19..	1		75	69	56	26	131	77	18	7	3	1	19	2	16	76	68	57	45	35
20..	....		47	99	102	33	163	61	57	4	18	26	11	5	32	161	61	85	221	32
21..	1		340	94	82	44	479	61	20	49	8	11	53	5	42	145	98	97	35	37
22..	1		120	92	133	67	214	136	62	10	3	7	10	3	27	47	54	69	34	6
23..	1		112	36	46	16	150	56	4	16	5	5	14	3	23	77	44	124	66	25
24..	....		146	94	72	24	266	68	2	50	17	3	14	....	12	62	80	65	5	37
25..	1		57	109	76	7	137	109	3	16	16	6	14	5	11	32	72	35	32	23
26..	1		30	69	59	26	72	110	2	8	19	6	10	15	13	96	72	89	27	58
27..	1		134	128	47	28	213	120	4	29	15	3	18	....	12	59	101	46	19	15
28..	1		59	48	102	31	124	52	64	16	9	6	17	3	14	173	104	129	13	15
29..	....		120	163	130	21	330	104	....	60	2	2	7	4	24	71	52	84	48	32
30..	....		93	111	64	19	216	68	3	8	5	3	20	6	.....	30	130	55	6	6
31..	....		56	50	91	30	102	113	12	10	45	5	10	15	25	38	93	37	24	6
32..	1		114	89	112	39	254	76	24	40	4	6	16	....	32	95	80	134	31	14
33..	1		61	82	36	19	105	90	8	10	4	2	15	....	35	135	32	125	73	35
34..	1		219	188	136	49	587	5	....	79	4	4	6	4	50	307	2	143	85	56
35..	1		175	133	67	26	383	10	8	36	5	12	11	11	12	272	12	186	80	14
36..	1		204	189	136	35	536	20	8	63	12	10	8	3	40	61	43	65	24	44
37..	1		129	33	52	23	118	47	72	20	20	1	12	....	5	34	40	52	21	18
38..	1		92	36	27	13	93	72	3	10	4	2	9	6	37	78	66	111	12	73
39..	1		134	126	60	20	249	91	....	32	.....	.....	.....	.....	.....	107	87	50	33	39
40..	1		101	124	68	23	185	126	5											
..	30		4,581	3,767	3,404	1,209	9,146	3,246	569	989	325	223	604	186	1,033	3,999	2,855	3,474	1,430	1,206

COLLEGIATE INSTITUTES

III.—Table K.—Miscellaneous

High schools.	Brick, stone or frame school house.	Number of acres in playground.	Schools under United Board.	Value of Library (not including Supplementary Reading in English Literature.)	Value of Supplementary Reading in English Literature.	Value of Scientific Apparatus.	Value of Charts, Maps and Globes.	Value of Models for Drawing.	Value of Gymnasium (not including Equipment.)	Value of Appliances for Physical Education.	Value of Museum of Natural History, etc.	Value of School Buildings, Grounds and Furniture, not included in preceding items.	Schools using authorized Scripture Readings.	Schools opened with prayer.	Schools closed with prayer.	Schools using the Bible.
				Equipment.												Religious and exer
				$	$	$	$	$	$	$	$	$				
1 Alexandria	B	1½		305		376	85					8,000		1	1	
2 Almonte	S	1	1	820	73	428	78	12		9				1		1
3 Arnprior	B	1	1	310	29	361	87			38		8,225		1	1	
4 Arthur	B	3		272	36	579	27	21		6		5,600		1		
5 Athens	S	2		135	64	448	69	19		1		6,000	1	1		
6 Aurora	B	4		336	73	443	69	8				8,000		1		1
7 Beamsville	B	½	1	309		587	70					6,000		1		
8 Belleville	B	1½	1	286	19	507	162	21				17,000		1	1	1
9 Berlin	B	4		398	17	1,360	46	20		22		15,000	1	1	1	1
10 Bowmanville	B	1½		554	35	495	60	8		2		18,500	1	1		1
11 Bradford	B	3		291	16	328	49	42		25	25	6,000		1	1	
12 Brampton	B	5		400	56	588	67	31		10	50	8,000	1	1		1
13 Brighton	B	2.5	1	270	28	303	42					5,500	1	1		1
14 Caledonia	B	2	1	424		509	33	4				5,000		1	1	
15 Campbellford	B	½	1	299	33	471	29					8,000	1	1		
16 Carleton Place	S	1	1	483	225	394	51	1		3	20	8,717		1		
17 Cayuga	B	1		278		346	25		40			4,000		1		
18 Colborne	B	½	1	258	9	352	87	5				8,000	1	1		
19 Cornwall	B	½		174		470	158	13				15,000	1	1		
20 Deseronto	B	3		294	37	394	86	4	360	210	35	16,000				
21 Dundas	B	2	1	471	12½	541	109	20		39		6,000		1	1	1
22 Dunnville	B	¼		368	17	457	65	23				5,500		1		
23 Dutton	B	1		201	18	534	31					4,800		1		
24 Elora	S	½		181	29	384	43	2				5,000	1	1		1
25 Essex	B	3½		287	65	479	68	28	700	231		10,000	1	1		
26 Fergus	S	¾	1	234	17	240	65					4,000		1		
27 Forest	B	2		306		306	62	21				10,000	1	1		1
28 Fort William	B			89	47	186	57	3				15,000		1	1	
29 Gananoque	B	1	1	476	44	485	108					27,000	1	1		
30 Georgetown	B	4		230	25	346	71	10				12,782	1	1		
31 Glencoe	B	2		316	44	566	55	28				9,000		1	1	1
32 Gravenhurst	B	7½		161	28	357	46					8,000		1	1	
33 Grimsby	F	1		168	6	296	29	10				2,000	1	1	1	
34 Hagersville	B	1½		316		458	54	28				6,000		1		1
35 Harriston	B	3		155	2	416	56	25				8,000	1	1		
36 Hawkesbury	B	1	1	736	5	394	45					12,000	1	1		
37 Iroquois	B	1¼		601	6	1,039	133	18		21	250	15,000	1	1		
38 Kemptville	B	2	1	300		406	18			18		10,000		1		
39 Kincardine	B	4	1	473	94	627	89	34		14		5,150	1	1		1
40 Leamington	B	1½		259	48	419	92	32		11		8,000	1	1		
41 Listowel	B	2½		333		401	64		250	42		7,000		1		
42 Lucan	B	3		227	85	601	73	18				10,000		1	1	
43 Madoc	B	1		171		408	90					8,000	1	1		1
44 Markham	B	2½		253	6	776	46	38		13		6,000	1	1	1	1
45 Meaford	B	3½		284	9	513	46	7	1,250	171		12,500		1		1
46 Mitchell	B	¾		232		412	64	21	566	225	1	2,500	1	1		
47 Mount Forest	B	2½		592	37	568	85			10		12,000	1	1		
48 Newburgh	S	1½	1	426	35	331	58					2,500		1	1	
49 Newcastle	B	2	1	169		309	52	4				8,000	1	1		
50 Newmarket	B	2½		162	36	331	71	20	350	87		11,000		1		1
51 Niagara	B	½		145		155	72	15				3,500		1	1	1
52 Niagara F. S.	B	2		239	29	344	41	3		30		10,000		1		
53 North Bay	B	1¼				210								1	1	
54 Norwood	B	10	1	359		308	21			2		8,000		1		1
55 Oakville	B	⅔	1	285	2	254	25	2				8,400	1	1		

AND HIGH SCHOOLS.—*Continued*

Information.—*Continued.*

other cases.	Number of pupils in—				Number of pupils from—			Destination of pupils.						Occupation of parents.				
Refugees instruction imparted	Commencement exercises.	Form I.	Form II.	Form III.	Form IV.	Municipalities composing the High School District.	Municipalities within the county.	Other counties.	No. who entered Mercantile life.	No. who became occupied with Agriculture.	No. who entered the professions of Law, Medicine and the Church.	Number who became teachers.	Number who entered any other profession.	Number who left for other occupations.	Commerce.	Agriculture.	Mechanical Occupations.	Professions.	Without occupation.
	1	78	23	41	.....	133	4	5	1	3	2	7	....	9	16	79	40	5	2
	1	28	72	31	2	99	28	6	11	4	.....	3	1	11	42	32	41	10	5
	.....	39	43	35	3	102	21	17	4	.....	.....	6	....	30	6	25	108	1	.....
	1	35	33	36	11	112	.....	3	5	8	2	9	....	2	37	63	6	1	8
	1	38	55	81	3	76	101	.....	1	5	3	19	2	2	30	103	25	9	10
	1	31	36	21	8	48	43	5	5	4	2	2	1	8	23	41	16	9	7
	.....	41	19	14	.....	37	35	2	9	7	.....	1	1	9	15	35	21	3	.....
	1	192	67	33	21	269	44	....	12	10	5	9	2	....	93	44	133	18	25
	1	74	58	50	9	104	87	.....	11	10	3	5	9	20	79	25	34	29	24
	1	59	33	20	9	80	41	.....	8	4	1	4	....	10	31	36	31	8	15
	1	29	38	39	3	43	66	.....	5	6	.....	7	....	5	14	78	8	9	.....
	1	84	42	39	20	101	80	4	8	12	5	14	3	10	38	94	40	8	5
	1	22	19	39	.....	34	46	.....	4	3	.....	4	....	6	14	41	6	6	15
	1	30	31	39	8	40	55	13	3	3	.....	6	....	6	21	63	11	9	4
	.....	61	27	42	4	96	31	7	7	1	.....	12	....	4	31	56	32	5	10
	.....	75	31	37	12	113	34	8	7	3	1	9	6	18	29	40	61	18	7
	.....	30	26	28	7	26	65	.....	12	5	.....	2	...	11	10	51	13	7	7
	.....	28	10	29	.....	47	20	.....	2	2	1	5	2	7	23	15	12	4	13
	.....	110	54	47	16	131	84	12	17	3	1	9	5	22	55	78	32	23	39
	.....	34	39	38	3	86	18	10	11	1	.....	6	4	10	34	30	45	4	1
	1	50	29	51	.....	84	46	.....	2	1	2	4	....	3	52	28	28	16	6
	.....	45	45	35	5	81	42	7	10	2	.....	5	....	10	45	40	33	10	2
	.....	30	52	80	35	70	121	4	3	6	4	9	....	6	15	10	41	7	27
	.....	37	30	37	6	56	54	.....	6	6	1	10	....	2	26	48	14	12	10
	1	49	25	28	12	51	62	1	7	3	.....	6	....	10	32	46	16	12	8
	.....	26	37	49	9	80	41	.....	13	7	4	13	....	...	25	40	30	15	11
	.....	33	28	49	5	55	58	2	1	3	2	6	2	16	17	70	14	4	10
	.....	34	15	10	1	60	.....	.....	4	.....	1	.....	6	2	10	2	25	8	15
	1	43	44	40	.....	87	26	14	6	.....	3	8	....	18	30	45	36	14	2
	1	30	27	38	10	45	35	25	8	3	.....	5	....	10	20	42	17	8	18
	1	22	27	37	5	44	47	.....	3	1	1	1	....	17	15	45	14	6	11
	.....	19	24	30	2	56	14	5	6	3	4	6	6	5	19	17	28	7	4
	1	31	19	19	.....	35	24	10	2	3	.....	4	1	2	14	40	8	5	2
	1	34	17	35	6	41	51	.....	3	1	.....	3	....	10	16	47	20	5	4
1	1	29	23	60	14	75	20	31	5	5	.....	5	2	2	38	43	15	10	10
	1	34	12	23	11	31	39	10	7	1	....	3	1	8	26	27	17	9	1
	1	52	37	37	9	26	70	19	4	8	.....	5	1	11	18	69	31	16	1
	.....	43	54	91	16	68	49	87	1	2	5	15	.....	.....	40	85	45	15	19
	.....	48	44	57	12	82	79	.....	9	5	7	13	....	13	32	87	23	16	3
	1	39	25	54	10	62	62	4	3	3	1	9	....	6	22	45	20	14	27
	1	35	65	56	3	88	42	29	5	4	7	7	2	5	37	64	35	15	8
	1	37	42	47	21	59	88	.....	2	2	1	10	2	11	31	75	10	12	10
	.....	26	18	45	2	46	44	1	4	3	1	11	4	5	14	39	20	10	8
	1	46	65	87	19	30	168	19	24	10	5	14	....	14	42	99	41	16	19
	1	38	38	50	23	70	74	4	2	3	1	13	.....	.....	34	57	17	23	17
	1	44	36	36	.....	64	52	....	6	3	1	6	1	2	14	49	37	8	14
	1	48	39	64	17	100	24	44	4	2	7	13	2	10	36	54	36	26	16
	.....	32	47	56	.....	34	95	6	10	10	4	5	1	4	15	80	25	5	10
	.....	16	20	12	.....	20	28	.....	2	3	.....	.....	.....	5	14	13	3	3	13
1	1	34	46	31	3	67	44	3	6	4	.....	4	....	13	28	31	51	9	5
	.....	20	18	5	2	25	20	.....	.....	6	.....	.....	.....	6	4	90	15	8	3
	.....	28	31	16	.....	73	2	.....	2	3	.....	2	....	5	15	30	23	2	5
	.....	31	14	9	.....	49	1	4	2	.....	.....	.....	.....	3	26	3	13	2	10
	.....	40	46	44	.....	60	51	19	4	10	.....	10	....	6	15	72	25	6	12
	1	37	18	21	.....	42	34	.....	5	2	.....	2	2	3	22	28	15	8	3

COLLEGIATE INSTITUTES

III.—Table K.—Miscellaneous

High Schools.	Brick, stone or frame school house.	Number of acres in playground.	Schools under United Board.	Value of Library (not including Supplementary Reading in English Literature).	Value of Supplementary Reading in English Literature.	Value of Scientific Apparatus.	Equipment. Value of Charts, Maps and Globes.	Value of Models for Drawing.	Value of Gymnasium (not including Equipment).	Value of Appliances for Physical Education.	Value of Museum of Natural History, etc.	Value of School Buildings, Grounds and Furniture, not included in preceding items.	Schools using authorized Scripture Readings.	Schools opened with prayer.	Religious exer Schools closed with prayer.
				$			$		$	$	$	$			
56 Omemee	F	1	1	232	9	312	41			3		3,000	1	1	1
57 Orangeville	B	2½		628	8	590	57	26				11,250		1	1
58 Oshawa	B	3	1	376		426	98	14			50	9,000	1	1	
59 Paris	B	4	1	350	5	549	108	9				8,500	1	1	1
60 Parkhill	B	3	1	290	26	483	93	9		11	50	8,300		1	
61 Pembroke	B	¾	1	259	19	496	92	15			25	12,000		1	
62 Petrolea	B	2		103		389	44	5				7,500	1	1	1
63 Picton	B	3		619	26	663	118	45				10,000		1	
64 Port Arthur	B	4		294		309	48				20	15,000		1	1
65 Port Dover	B	1	1	361	4	442	19	20		7		9,000	1	1	1
66 Port Elgin	B	1½		182	59	404	43	30				1,500		1	
67 Port Hope	B	¾		479	53	594	88	8		10		14,262	1	1	
68 Port Perry	B	1¼	1	277	3	457	45	8	200	30	5	10,000		1	
69 Port Rowan	B	2	1	93		229	44			8		5,000	1	1	1
70 Prescott	B	1½	1	194	54	367	112			29		18,235		1	
71 Rat Portage	B	1½	1	139		303	54							1	1
72 Richmond Hill	B	1¼	1	166	18	299	51	35		3		6,500	1	1	
73 Sault Ste. M'rie	B			32		190	12						1	1	1
74 Simcoe	B	5	1	265	31	671	134	29		29		14,000	1	1	1
75 Smith's Falls	B	¾	1	128	125	195	67	5				8,000		1	1
76 Smithville	B	1¼		107		284	35					3,200	1	1	1
77 Stirling	B	1	1	158	9	273	33					1,500		1	
78 Streetsville	B	¼		179	35	225	71	2			25	3,000	1	1	1
79 Sydenham	B	1½		262	91	289	31					15,000		1	1
80 Thorold	B	2¼		261	8	339	69	3		4		8,500		1	
81 Tillsonburg	B	2¼		235	29	530	84	2		11	120	12,500		1	1
82 Trenton	B	3½	1	383	8	340	81	7				6,200	1	1	
83 Uxbridge	B	¾	1	281	37	332	52	4				8,000	1	1	1
84 Vankleekhill	B	2½		539	4	712	37	3	3,600	22		12,000		1	
85 Vienna	B	2	1	224	6	256	121	8	500	70		3,500	1	1	1
86 Walkerton	B	1¼		230		157	54			7		8,000	1		
87 Wardsville	B	1	1	219	14	240	53	33				5,000		1	1
88 Waterdown	S	3¼	1	195	6	331	55	15				3,000		1	
89 Waterford	B	3		319	20	411	64					7,800		1	
90 Watford	B	2		333		405	110	17		20		8,000			
91 Welland	B	1		186	31	377	32					12,000		1	1
92 Weston	B	⅛		275	5	134	105	15				5,000		1	1
93 Wiarton	S	1½		312	15	275	15					8,500		1	
94 Williamstown	B	3		191	41	522	32					10,000		1	1
1 Totals, H.S	B. 84, S. 2, F.	186,19	38	28,618	2,380	40,131	6,049	1,028	7,756	1,528	696	777,421	40	91	37
2 " Coll. Inst	36 1	95,5	16	31,448	1,961	41,502	5,481	850	48,679	8,687	2,438	1,216,091	20	39	11
3 G'd totals, 1902	120 12 2	281,69	54	60,066	4,341	81,633	11,530	1,878	56,435	10,215	3,134	1,993,513	60	130	48
4 " " 1901	116 13 2	280,50	56	58,506	3,859	78,806	11,275	1,921	57,518	10,370	3,338		56	127	51
5 Increases	4	1,19	1	1,560	482	2,827	255						4	3	
6 Decreases	1							43	1,083	155	204				3
7 Percentages			40										15	97	36

AND HIGH SCHOOLS.—*Concluded.*

Information.—*Concluded.*

and other cises.			Number of pupils in –				Number of pupils from—			Destination of pupils.						Occupation of parents.				
	Schools using Bible.	Religious instruction imparted.	Commencement Exercises.	Form I.	Form II.	Form III.	Form IV.	Municipalities composing the High School District.	Municipalities within the County.	Other counties.	Number who entered Mercantile life.	Number who became occupied with Agriculture.	Number who entered the professions of Law, Medicine and the Church.	Number who became teachers.	Number who entered any other profession.	Number who left for other occupations.	Commerce.	Agriculture.	Mechanical occupations.	Professions.	Without occupation.
56				29	22	22	.....	42	25	6	1	2	1	2	6	6	3	43	8	6	13
57			1	56	48	101	21	100	76	50	16	4	6	20	4	22	62	98	31	16	19
58			1	94	54	29	23	123	64	14	17	8	1	10	....	16	46	69	57	20	9
59			1	58	24	23	7	80	29	4	9	8	....	1	....	10	23	34	37	5	13
60			1	31	37	45	11	63	56	5	6	2	....	8	....	1	30	70	14	5	5
61			1	57	66	38	6	123	41	3	11	1	6	6	1	14	49	34	41	27	16
62	1			72	32	37	6	88	58	1	11	4	6	2	3	15	25	33	56	10	23
63				56	94	68	17	116	115	4	.....	.....	.....	21	.....	.....	53	113	54	12	3
64			1	35	25	17	.....	75	2	.....	12	4	....	5	....	6	6	10	42	5	14
65			1	24	28	33	.....	54	22	9	11	7	....	6	5	7	10	32	11	7	25
66	1		1	39	21	38	.....	52	44	2	5	2	1	2	1	10	28	30	17	11	12
67			1	72	43	60	19	131	63	.....	21	2	2	10	2	10	53	70	42	8	21
68			1	30	31	30	15	106	.....	.....	19	8	4	8	6	.....	30	37	27	10	2
69				36	7	12	.....	26	27	2	4	2	3	4	2	.....	9	30	14	....	2
70			1	31	23	28	9	67	22	2	3	2	2	4	2	10	20	18	27	6	20
71	1		1	29	18	37	.....	81	3	.....	3	2	1	.....	5	13	25	3	38	9	9
72			1	29	28	28	.....	15	65	.....	5	1	1	1	....	11	28	40	6	2	4
73	1			64	25	25	.....	103	11	.....	6	.....	.....	3	....	25	39	4	60	10	1
74	1		1	45	57	66	14	84	93	5	20	25	3	25	....	15	46	82	30	14	10
75			1	75	48	41	11	120	30	25	5	14	4	9	5	9	33	46	81	15	....
76				32	24	39	5	63	35	2	.....	4	1	9	2	10	7	44	18	4	27
77	1			15	12	30	4	61	.....	.....	2	.....	....	3	....	6	10	40	8	3	....
78	1			27	11	18	.....	20	25	11	.....	6	....	2	2	10	7	29	5	2	13
79				58	53	55	.....	166	.....	.....	4	10	4	6	....	.....	8	150	....	2	6
80	1		1	22	29	22	7	62	15	3	3	4	4	4	1	3	16	20	29	5	10
81	1		1	44	28	38	.....	69	22	19	7	4	2	8	....	12	21	51	16	7	15
82			1	32	30	37	2	68	9	24	12	2	1	2	....	13	25	26	36	11	3
83			1	46	32	23	5	57	48	1	3	3	....	7	1	.....	21	42	20	9	14
84			1	37	75	72	9	71	98	24	6	3	....	12	....	1	19	112	27	6	29
85				15	15	12	.....	39	.....	3	3	5	....	5	....	.....	6	20	12	2	2
86			1	33	28	72	25	88	61	9	13	17	5	21	3	10	30	71	31	16	10
87				15	8	22	.....	23	12	10	2	5	1	.....	1	2	5	27	....	6	7
88			1	19	20	35	.....	65	6	3	1	2	6	3	....	4	15	34	8	10	7
89			1	39	33	20	9	30	66	5	1	8	6	7	1	4	18	59	13	6	5
90			1	50	40	61	12	59	98	6	5	15	3	9	1	24	33	95	17	6	12
91	1		1	51	40	81	17	82	108	2	8	5	1	6	2	16	78	57	34	23	....
92	1			26	21	16	1	59	.....	5	3	1	1	1	.....	.....	21	15	12	7	9
93	1		1	27	28	36	.....	60	20	11	2	3	1	4	6	15	25	16	31	13	6
94				75	16	28	.....	114	.....	5	.....	1	....	4	....	.....	4	105	8	2	....
1	29	1	57	4,003	3,181	3,673	651	6,718	4,078	716	584	418	165	634	131	781	2,478	4,627	2,578	881	947
2	14		30	1,581	3,767	3,404	1,209	9,146	3,246	569	989	325	223	604	186	1,033	3,999	2,855	3,474	1,430	1,203
3	43	1	87	8,587	6,948	7,077	1,860	15,864	7,324	1,284	1,573	743	388	1,238	317	1,814	6,477	7,482	6,052	2,311	2,150
4	40		84	7,797	6,392	6,652	1,682	14,692	6,714	1,117	1,300	833	347	1,250	303	1,779	5,984	6,747	5,862	2,144	1,786
5	3	1	3	790	556	425	178	1,172	610	167	273	....	11	.....	14	35	493	735	190	167	364
6				.....	.....	.....	.....	.....	.....	.....	.....	90	....	12	....	....	....	....	....	....	....
7	32		65	35.09	28.39	28.92	7.6	64.82	29.93	5.25	26	12	6	21	5	30	26.47	30.57	24.73	9.45	8.78

Table L.—Protestant Separate Schools.

Statistics.	No. 9, Cambridge.	No. 6, North Plantagenet.	Rama Township.	No. 1, North Tilbury.	L'Original Village.	Penetanguishene Town.	Totals
Number of Schools	1	1	1	1	1	1	6
Receipts:	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Balances from 1901	10 94	45 08	86 92	7 94	295 48	9 77	456 13
Government grants	4 85	3 15	37 40	19 20	26 75	134 17	225 52
Municipal grants			323 60	159 00	349 29	1,972 11	2,795 00
Trustees' school taxes	88 89	310 00	175 00	550 00			1,123 89
Other sources				257 23	7 85	10 00	275 08
Totals	104 68	358 23	622 92	984 37	679 37	2,126 05	4,875 62
Expenditure:							
Teachers' salaries	87 75	250 00	350 00	240 00	300 00	1,525 06	2,750 81
School sites and buildings		10 75		129 50		258 50	398 75
Libraries, maps, etc			17 60		13 45		31 05
Other expenses	10 75	16 00	66 26	595 12	88 32	251 58	1,028 03
Totals	98 50	276 75	433 86	964 62	401 77	2,033 14	4,208 64
Balances on hand	6 18	81 48	189 06	19 75	277 60	92 91	667 98
Teachers:							
Male			1			1	2
Female	1	1		1	1	3	7
Certificates	Temp.	II	II	III	III	4, II	6, II; 2, III; 1 Temp.
Salaries	156 00	250 00	350 00	300 00	300 00	Male, $650 00 Female, $300 00	Av. Male, $500 00 Av. Female $272 00
Pupils:							
Total number attending	15	10	98	48	34	261	466
Boys	8	2	52	28	17	142	249
Girls	7	8	46	20	17	119	217
Average attendance	6	3	40	21	20	157	247
No. in 1st Reader, Part I	4	2	25	13	7	57	108
" 1st " Part II	1	2	19	12	3	64	101
" 2nd "	5	1	15	8	6	48	83
" 3rd "	3	1	23	7	8	49	91
" 4th "	2	4	15	8	9	29	67
" 5th "			1		1	14	16
" Writing	10	10	73	48	34	261	436
" Arithmetic	15	10	73	48	31	261	443
" Drawing	12	10	90	48	24	261	445
" Geography	10	6	39	23	24	183	285
" Music	10	10				78	98
" Grammar and Composition	10	10	39	23	24	261	367
" English History	2	4	16	8	5	43	78
" Canadian History	2	4	39	15	5	91	156
" Physiology and Temperance		4	16	18	5	29	102
" Drill and Calisthenics	15	10	98			261	384
" Bookkeeping			1			14	15
" Algebra			1			14	15
" Geometry			1			14	15
" Botany						14	14
School houses (brick, frame or log)	Log	Frame	Frame	Brick	Brick	Brick	3B, 2F, 1L
Number of maps	6	8	19	3	12	8	56
Number of globes			1	1	2		4

Table M.—Report on Truancy.

Cities.	No. of children otherwise employed during school hours.	No. of cases of truancy reported to the Truant Officer.	No. of notices sent by Truant Officer to parents or guardians.	No. of complaints made before Police Magistrates or J. P's.	No of convictions.	No. of children not attending any school.
Chatham		10				
Guelph	6	28	36	2	2	2
Hamilton		140	350	67	18	
St. Catharines		39	62			
St. Thomas	2	63	42	4	3	
Stratford		66	29	4	4	
Toronto	146	579	52	14	12	
Windsor	1	19	19	1		19
Woodstock			68	3		
Towns.						
Almonte		27	27			
Amherstburg		3	1			
Arnprior		9	9	2	2	
Aylmer		17	17	2	2	
Barrie		13	5			
Berlin	9	9	3	2	1	
Bowmanville		10	6			10
Bracebridge		6	12			
Brampton		15	2			
Brockville		11	11	3		
Carleton Place		20	10			4
Cobourg		5	9	2		
Cornwall		4	4			
Deseronto		25	10			8
Dundas		52	48	2	2	
Dunnville			4			
Durham		6	6			
Forest	2	11	4	2	2	
Galt		16	20	7	5	1
Gravenhurst		30	30			
Harriston		1	1			
Hespeler		14	5			
Huntsville		7	20			
Ingersoll		6	8			
Kingsville	6	15		3		2
Leamington		25	15			
Lindsay	8	78	86			2
Listowel	2	8	8			
Mount Forest		3	3			3
Newmarket		7	7			
Niagara		7				
Niagara falls		141	16			
North Bay	3					
Orangeville		1		1		
Owen Sound		4	1			2
Perth						
Peterborough						
Petrolea		7	25			
Prescott						
Preston		15	20			
St. Mary's			10			
Sarnia		7	51			
Sault Ste. Marie			10			
Seaforth			2			
Simcoe			2			
Thornbury			10			
Thorold			8			
Tillsonburg			70			
Toronto Junc.			17			
Welland		6	30			
Villages						
Acton			10			
Ayr		1	2			
Bath			1			
Bradford		4	2			
Brighton		5	2			
Caledonia			2			
Colborne			6			
Delhi			8			
Elora			6			
Exeter			17			
Fenelon Falls			2			
Fergus			2			
Fort Erie			2			
Georgetown			26			
L'Orignal			2			
Merrickville			2			
Newcastle			2			
Oil Springs			13			
Omemee						
Point Edward						
Port Dover		2	8			
Port Elgin			2			
Stirling			5			
Tara			6			
Tilbury						
Tweed			5			
Winchester			8			
Totals		232	2,087	1,423	128	53

Towns.	No. of children otherwise employed during school hours.	No. of cases of truancy reported to Truant Officer.	No. of notices sent by Truant Officer to parents or guardians.	No. of complaints made before Police Magistrates or J. P's.	No of convictions.	No. of children not attending any school.
Perth			14			
Peterborough			21	21		
Petrolea		7	25	17		10
Prescott			34			
Preston		15	20			
St. Mary's			10	10		
Sarnia		7	51	8		
Sault Ste. Marie			10	2		
Seaforth			2	2		
Simcoe			2	10		
Thornbury			10			
Thorold			8	4	1	1 4
Tillsonburg			70	10		
Toronto Junc.			17	17		
Welland		6	30	30	4	
Villages						
Acton			10	3		5
Ayr		1	2	2		
Bath			1	1		
Bradford		4	2	20		
Brighton		5	2	10		
Caledonia			2	13		3
Colborne			6	3		
Delhi			8	6		2
Elora			6	6		
Exeter			17	2		
Fenelon Falls			2	2		
Fergus			2	2		
Fort Erie			2			
Georgetown			26	21		
L'Orignal			2	12		
Merrickville			2			
Newcastle			2	2		
Oil Springs			13	9		
Omemee						12
Point Edward				1		
Port Dover		2	8	1		
Port Elgin			2			
Stirling			5	4	1	5
Tara			6	6		
Tilbury				6		
Tweed			5	2		
Winchester			8	8	1	1
Totals	232	2,087	1,423	128	53	92

Table N.—Report on Kindergartens.

Municipality.	No. of Kindergartens.	No. of Teachers.	No. of pupils attending.	Average daily attendance.
Cities:				
Brantford	4	9	441	147
Chatham	2	4	247	86
Guelph	1	2	147	54
Hamilton	13	16	1,293	516
Kingston	4	4	338	124
London	15	30	1,082	358
Ottawa	14	28	1,186	459
Stratford	3	4	286	81
Toronto	45	126	4,485	1,952
Towns:				
Aylmer	1	2	114	46
Berlin	4	5	241	204
Cobourg	1	1	79	39
Dundas	1	1	110	53
Galt	1	1	97	48
Hespeler	1	2	133	52
Ingersoll	1	2	86	36
Owen Sound	1	2	164	44
Peterborough	2	4	200	70
Preston	1	1	123	54
Simcoe	1	1	130	41
Tillsonburg	1	1	80	28
Toronto Junction	2	4	159	77
Village:				
Ashburnham	1	2	*79	27
Totals	120	247	11,300	4,596

*Statistics of preceding year.

Table O.—Report on Night Schools.

Municipality	No. of Night Schools.	Teachers.	Pupils attending.	Average daily attendance.
St. Catharines	1	1	25	6
Toronto	9	15	630	154
No. 11, Moore Tp., Brigden P. O.	1	1	15	10
Totals	11	17	670	170

Table P.—General Statistical Abstract.

A General Statistical Abstract, exhibiting the comparative state and progress of Education in Ontario, as connected with Public, Separate and High Schools (including Collegiate Institutes), also Normal College and Model Schools, from the year 1867 to 1901, compiled from returns in the Education Department.

No.	Subjects compared.	1867.	1872.	1877.	1882.	1887.	1892.	1897.	1901.	1902.
1	Population	.....	1,620,851	.....	1,926,922	.....	2,114,321	.....	.....	2,167,978
2	School population between the ages of five and sixteen years, up to 1884, (and five to twenty-one subsequently)	147,726	195,756	191,801	483,817	611,212	595,238	590,055	571,190	584,512
3	High Schools (including Collegiate Institutes)	102	101	104	104	112	128	130	131	134
4	Normal College and Normal and Model Schools	3	3	4	6	6	6	7	8	8
5	Total Public Schools in operation	4,261	4,490	4,955	5,013	5,277	5,577	5,574	5,663	5,671
6	Total Roman Catholic Separate Schools	161	171	185	190	229	312	340	372	391
7	Grand total of all schools in operation	4,527	4,768	5,248	5,313	5,621	6,023	6,051	6,174	6,204
8	Total pupils attending High Schools (including Collegiate Institutes)	5,696	7,968	9,229	12,318	17,459	22,837	24,390	22,523	24,472
9	Total students and pupils attending Normal College, Normal and Model Schools	800	800	900	1,059	1,204	1,270	1,492	1,647	1,709
10	Total pupils attending Public Schools	382,719	433,256	465,908	445,364	462,839	418,204	411,157	426,824	420,094
11	Total pupils attending Roman Catholic Separate Schools	18,924	21,406	21,952	26,148	30,373	37,466	41,620	43,987	45,961
12	Grand total, students and pupils attending High, Public, Separate Schools Normal College, and Normal and Model Schools	408,139	463,430	500,989	484,919	511,875	509,777	508,659	494,981	492,239
13	Total amount paid for the salaries of public and Separate School Teachers	$1,093,516	1,371,594	2,038,099	2,111,148	2,458,540	2,752,628	2,886,061	3,055,321	3,198,132
14	Total amount paid for the erection and repairs of Public and Separate School houses, and for libraries, apparatus, books, fuel stationery, etc	$379,672	835,770	1,035,390	882,526	1,283,565	1,301,289	1,329,609	1,604,989	1,627,028
15	Grand total paid for Public and Separate School Teachers' salaries, the erection and repairs of school houses, and for libraries, apparatus, etc	$1,473,188	2,207,364	3,073,489	3,026,974	3,742,105	4,053,917	4,215,670	4,720,310	4,825,160
16	Total amount paid for High School (and Collegiate Institute) Teachers' salaries	$94,820	141,812	211,607	253,864	327,452	470,828	532,837	535,521	547,402
17	Total amount paid for erection and repair of High School (and Collegiate Institute) houses, maps, apparatus, prizes, fuel, books, etc	$19,190	31,360	51,417	89,857	168,160	215,871	183,139	192,011	222,278
18	Grand total paid for educational purposes as above	$1,587,198	2,380,536	3,336,513	3,370,695	4,237,717	4,740,616	4,931,646	5,448,442	5,594,840
19	Total public and Separate School Teachers	4,890	5,476	6,468	6,857	7,594	8,480	9,128	9,494	9,631
20	Total male teachers	2,849	2,626	3,020	3,062	2,718	2,770	2,784	2,459	2,311
21	Total female teachers	2,041	2,850	3,448	3,795	4,876	5,710	6,344	7,035	7,320

APPENDIX B.—TEACHERS' INSTITUTES.

FINANCIAL STATEMENT, 1902.

Name of Institute.	Number of Institutes.	Number of Members.	Receipts.					Expenditure.				
			Government Grant.	Municipal Grant.	Members Fees.	Balances and other sources.	Total receipts.	Printing, postage, etc.	Libraries, educational journals, etc.	Miscellaneous	Total expenditure.	Balances.
			$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1 Algoma	1	98	25 00	.....	.....	17 24	72 24	8 07	2 60	13 25	23 92	48 32
2 Brant	1	127	25 00	25 00	.....	135 60	185 60	5 20	.....	36 25	41 45	144 15
3 Bruce East	1	125	25 00	25 00	.....	50 19	100 19	23 66	28 35	18 18	100 19	.....
4 Bruce, West	1	40	25 00	25 00	10 00	95 99	155 99	6 77	24 38	59 50	90 65	65 34
5 Carleton	1	135	25 00	25 00	.....	29 29	79 29	20 43	.....	37 00	57 43	21 86
6 Dufferin	1	122	25 00	25 00	17 75	29 53	97 28	8 00	15 00	3 28	26 28	71 00
7 Durham	1	120	25 00	25 00	.....	66 97	116 97	12 40	39 25	39 50	91 15	25 82
8 Dundas	1	115	25 00	25 00	21 25	82 94	157 19	28 99	.....	52 85	81 84	75 35
9 Elgin	1	175	25 00	25 00	.....	111 80	164 80	3 00	.....	.....	3 00	161 80
10 Essex, North	1	60	25 00	50 00	.....	84 53	159 53	12 00	.....	12 00	24 00	135 53
11 Essex, South	1	120	25 00	50 00	.....	104 63	179 63	28 75	.....	12 50	41 25	138 38
12 Frontenac	1	150	25 00	25 00	.....	51 89	101 80	6 17	14 50	27 15	47 82	54 07
13 Glengarry	1	92	25 00	25 00	.....	28 41	78 41	21 04	.....	38 20	59 24	19 17
14 Grenville (Leeds No 3)	1	97	25 00	25 00	.....	78 56	128 56	8 20	.....	37 10	45 30	83 26
15 Grey, East	1	49	25 00	25 00	4 75	49 78	104 53	1 00	.....	86 50	87 50	17 03
16 Grey, South	1	49	25 00	25 00	12 25	219 43	281 68	18 71	55 00	51 70	125 41	156 27
17 Grey, West	1	98	25 00	25 00	12 25	91 14	153 39	27 00	8 25	49 10	84 35	69 04
18 Haldimand	1	116	25 00	25 00	.....	221 34	271 34	8 75	11 00	29 95	49 70	221 64
19 Haliburton	1	59	25 00	25 00	1 75	39 41	91 16	8 86	10 98	35 30	85 14	6 02
20 Halton	1	90	25 00	25 00	.....	91 72	141 72	9 75	27 87	47 85	85 47	56 25
21 Hastings, North	1	119	25 00	.....	16 20	159 13	200 33	32 02	53 65	23 30	108 97	91 36
22 Hastings, South	1	136	25 00	25 00	.....	207 98	257 97	.....	.....	40 00	40 00	217 98
23 Huron, West (8)	1	48	25 00	25 00	12 00	68 08	130 08	7 10	7 20	50 85	65 15	64 93
24 Huron, East (N)	1	125	25 00	25 00	.....	4 99	54 99	3 75	.....	32 60	36 35	18 64
25 Kent, East	1	89	25 00	25 00	26 50	94 25	170 75	19 11	10 59	78 60	108 30	62 45
26 Kent, West	1	135	25 00	25 00	25 00	68 35	143 35	13 97	.....	85 30	99 27	44 08
27 Lambton, East	1	122	25 00	25 00	22 00	192 48	264 48	33 88	.....	54 30	88 18	176 30
28 Lambton, West	1	116	25 00	25 00	.....	91 88	141 88	4 20	.....	63 25	67 45	74 43
29 Lanark	1	200	25 00	25 00	20 15	176 83	246 98	15 07	39 28	25 00	79 33	167 65
30 Leeds, East (2)	1	122	25 00	25 00	17 90	139 93	207 83	9 99	67 15	52 40	129 54	78 29
31 Leeds, West (1)	1	100	25 00	25 00	.....	73 69	128 69	6 93	62 65	.....	69 64	54 05
32 Lennox and Addington	1	128	25 00	25 00	.....	10 41	90 41	10 55	.....	28 45	39 00	51 41
33 Lincoln	1	128	25 00	25 00	.....	180 50	230 50	7 85	.....	42 15	50 00	180 50
34 Manitoulin	1	21	25 00	.....	.....	48 45	73 45	6 25	16 85	7 15	60 25	13 20
35 Middlesex, East	1	97	25 00	75 00	24 25	14 71	138 96	84 95	5 51	29 86	121 32	14 64
36 Middlesex, West	1	109	25 00	100 00	55 00	135 71	315 71	15 50	.....	149 70	195 20	120 51

37 Muskoka	1	65	25 00			130 85	155 85	9 50		2 50	12 00	143 85
38 Nipissing	1	20	10 00		13 25	26 33	79 58	5 20	15 15	43 93	64 28	15 30
39 Norfolk	1	140	25 00	50 00		53 98	128 98	39 09	45 00	37 75	121 84	7 14
40 Northumberland	1	150	25 00	25 00		182 91	232 91	18 35		68 70	86 95	145 96
41 Ontario, North	1	65	25 00	25 00	32 50	31 98	114 48	4 19	3 75	43 95	51 89	62 59
42 Ontario, South	1	81	25 00	25 00		80 94	130 94	7 15		24 50	31 65	99 29
43 Oxford	1	78	25 00	25 00	18 25	49 40	117 65	6 03	15 33	49 50	70 86	46 79
44 Parry Sound, East	1	30	25 00		18 55	26 91	70 46	3 28		53 25	56 53	13 93
45 Parry Sound, West	1	40	25 00		5 50	34 40	64 90	5 59	36 35	2 50	34 44	30 46
46 Peel	1	100	25 00	25 00		46 61	96 61	5 50	15 00	10 00	60 50	36 11
47 Perth	1	175	25 00	25 00	65 50	49 95	165 45	19 71	57 10	62 50	139 31	26 14
48 Peterborough	1	110	25 00	25 00		21 61	71 61	9 91	10 82	50 88	71 61	
49 Prescott and Russell Bi-lingual	1	120	25 00			79 53	104 53	8 35		25 80	34 15	70 38
50 Prescott and Russell	1	90	25 00	25 00		57 52	107 52	10 00		1 25	11 25	96 27
51 Prince Edward	1	90	25 00	25 00		116 81	160 81	3 20	18 82	17 95	69 97	90 84
52 Rainy River	1	27	25 00		10 50	29 40	64 90	4 60		14 00	18 60	46 30
53 Renfrew	1	71	25 00	25 00		32 32	82 32	6 35		55 00	61 35	20 97
54 Simcoe, East	1	64	25 00	25 00		50 84	100 84	21 65	1 25	30 35	53 25	47 59
55 Simcoe, North	1	142	25 00	25 00		86 43	136 43	3 70	25	54 83	58 78	77 65
56 Simcoe, South West	1	60	25 00	25 00	15 00	261 00	326 00	9 63	160 00	30 00	200 23	125 77
57 Stormont	1	54	25 00	25 00	13 50	43 24	106 74	3 50	5 00	60 20	68 70	38 04
58 Thunder Bay (Algoma W.)	1	30	25 00			12 64	37 64	1 95	13 65		15 60	22 04
59 Victoria, East	1	83	25 00	37 50	10 75	60 84	134 09	32 50	10 00	41 04	83 54	50 55
60 Victoria, West	1	72	25 00	25 00		18 67	68 67	6 00	20 00	8 40	34 40	34 27
61 Waterloo	1	84	25 00	25 00	42 00	10 61	102 61	12 30		79 28	91 58	11 03
62 Welland	1	154	25 00	25 00		52 02	102 02	12 11		51 70	63 81	38 21
63 Wellington, North	1	118	25 00	25 00	10 50	85 57	146 07	16 60	33 58	3 00	53 18	92 89
64 Wellington, South	1	83	25 00	25 00		86 19	136 19	7 94		68 25	76 19	60 00
65 Wentworth	1	108	25 00	25 00		73 83	123 83	64 00	2 26	34 00	100 26	23 57
66 York, North	1	10	25 00	25 00	10 00	67 43	127 43	11 20	55 34	42 00	108 54	18 89
67 York, South	1	99	25 00	25 00	24 75	111 13	185 88	11 50	2 50	62 00	76 00	109 88
68 *Ontario Educational Association	1	674	600 00		337 00	738 01	1,675 01	1,036 26		315 95	1,372 21	302 80
	677 s.											
69 Guelph	1	35	25 00	25 00		20 71	70 71	90	19 32	3 60	23 82	46 89
70 Hamilton	1	183	25 00	25 00	15 25	131 66	226 91	16 94	4 95	56 85	78 44	148 47
71 Kingston	1	89	25 00	25 00	16 50	77 32	143 82	11 37	30 90	52 90	95 17	18 65
72 London	1	160	25 00	25 00	16 00	15 24	81 24	7 90	16 00	27 00	50 90	30 34
73 Ottawa	1	165	25 00	25 00		29 94	79 94	3 10		28 20	31 30	48 64
74 St. Catharines	1	25	25 00	25 00		10 59	90 59	13	28 30		28 43	62 16
75 St. Thomas	1	40	25 00	25 00		47 30	97 30	2 00	20 70	35 60	58 30	39 00
76 Toronto	1	658	25 00	25 00	164 50	987 94	1,202 44	17 30	181 20	467 56	696 00	506 44
77 Windsor and Town of Walkerville	1	66	25 00	40 00		11 60	106 60	7 60		53 00	60 60	46 00
Totals, 1902	77	8,515	2,515 00	1,877 50	1,171 80	7,606 96	13,171 26	2,101 59	1,437 18	3,649 68	7,188 45	5,982 81
1901	78	8,372	2,525 00	1,895 00	1,110 50	8,368 29	13,898 79	1,880 46	1,404 42	4,380 24	7,665 12	6,233 67
Increases		143			61 30			221 13	32 76			
Decreases	1		10 00	17 50		761 33	727 53			730 56	476 67	250

* Statement for 1902 3

APPENDIX C.—*RURAL PUBLIC SCHOOL LIBRARIES*, 1902-3.

Every rural school board that established a Library under the conditions of the regulations received a grant, equivalent to half the amount expended for the year, but not exceeding $10.

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	Total amount expended for books recommended.	Total Government grant.
		$ c.	$ c.
Brant	8 Burford, $20.00; 1 and 2, Oakland and Townsend, $12.04; 13 South Dumfries, $31.00	63 04	26 02
Bruce, E.	16 Amabel and Keppel, $46.85; 6 Elderslie and Sullivan, $19.25	66 10	10 62
Bruce, W.	3 Culross, $35.00; 4 Culross, $30.00; 1 Huron, $31.45; 2 Huron, $22.30; 2 Saugeen, $21.65	140 40	50 00
Carleton	3 Gloucester, $22.13; 9 Gloucester, $21.00; 19 Gloucester, $23.00; 4 N. Gower, $31.75; 5 Huntley, $15.00; 2 March, $26.61; 6 Marlborough, $6.17; 3 Nepean, $30.13; 11 Nepean, $25.00; 12 Osgoode, $20.00; 4 Torbolton, $38.57	259 66	100 58
Dufferin	1 Amaranth, $20.00; 9 E. Luther, $20.00, 11 Mulmur, $23.86; 13 Mulmur, $30.00	93 86	40 00
Dundas	5 Mountain, $16.85; 6 Mountain, $19.80; 4 Winchester, $21.08; 12 Winchester, $5.71	63 44	31 17
Durham	18 Darlington, $10.00	10 00	5 00
Elgin	7 Aldborough, $20.00; 16 Bayham, $30.00; 3 Bayham, $20.00; 15 Dunwich, $11.06; 3 Malahide, $10.00; 6 Malahide, $20.00; 21 Malahide, $30.00; 4 Southwold, $10.00; 7 Southwold, $30.00; 14 Southwold, $20.00; 19 Southwold, $20.00; 2 Yarmouth, $20.00; 7 Yarmouth, $20.00; 8 Yarmouth, $20.00; 9 Yarmouth, $24.52; 19 Yarmouth, $22.00	327 58	145 53
Essex, S.	11 Colchester South, $10.40; 4 Gosfield South, $25.00; 5 Gosfield South, $22.26	57 66	26 20
Frontenac	8 Clarendon, $20.00; 5 Hinchinbrooke, $20.00; 1 Olden, $25.00; U. 8 Olden, $20.00; U. 11 Olden, $25.00; 9 Oso, $26.70; 11 Oso, $20.00; 2 Palmerston, $52.00; 1 Pittsburgh, $20.00; U. 13 Storrington, $20.00; 4 Wolfe Island, $25.00	271 70	120 00
Glengarry	16 Kenyon, $12.75; 4 Lochiel, $8.36	21 11	10 55
Grey, E.	17 St. Vincent, $22.50	22 50	10 00
Grey, S.	13 Artemesia, $9.80; 5 Bentinck, $19.80; 7 Egremont, $22.86, 15 Normanby, $20.95	72 51	34 35
Grey, W.	3 Derby, $10.24; U. 8 Holland, $9.00; 14 Sydenham, $12.00; U. 2 Sydenham, $11.50; U. 10 Sydenham, $11.50	54 24	27 12
Haldimand	1 Canboro, $20.38; 3 S. Cayuga, $6.00	56 38	13 80
Haliburton, etc	1 Anson, $28.91; 3 Cardiff, $28.01; 4 Cardiff, $24.00; 6 Chaffey, $58.00; 2 Glamorgan, $28.56; 2 Guilford, $42.38, 1 Himsworth, $14.15, 2 Laurier, $15.00; 1 McCraney, $15.00; 3 Minden, $19.32, 11 Minden, $10.05; 1 Monmouth, $20.00; 1 Nipissing, $23.50; 5 Strong, $15.47	342 35	124 48
Hastings, E.	1 Esquesing, $20; 3 Nelson, $20.01; 4 Nelson, $20.35; 8 Trafalgar, $20.08; 10 Trafalgar, $30.98; 12 Trafalgar, $6.75; 18 Trafalgar, $10.00	128 17	58 37
Hastings, S.	13 Sidney	10 00	5 00
Huron, E.	U. 4 Grey, $19.99; 9 Tuckersmith, $27.53	47 52	19 99
Huron, W.	10 Ashfield, $21.13; 7 Stephen $6.25	27 38	13 13

APPENDIX C.—*Continued.*

Inspectorate.	Name of school (section number and township and amount expended for books recommended during the academic year.	Total amount expended for books recommended.	Total Government grant.
		$ c.	$ c.
Kent, E.	5 Camden, $25.00; 6 Camden, $20.60; 11 Camden, $20.00; 1 Harwich, $20.00; 2½ Harwich, $20.00; 3 Harwich, $30.00; 4 Harwich, $20.00; 5½ Harwich, $20.00; 6 Harwich, $20.00; 7 Harwich, $40.00; 13½ Harwich, $35.00; 16 Harwich, $25.00; 1 Howard, $30.00; 11 Howard, $12.00; 1 Orford, $12.00; 3 and 4 Orford, $20.00; 4 Zone, $21.00	390 00	162 00
Kent, W.	3 Chatham, $30.00; 5 Chatham, $21.00; 6 Chatham, $9.00; 7 Chatham, $30.50; 11 Chatham, $23.50; 12 Chatham, $10.00; 13 Chatham, $20.00; U. 1 Chatham, $13.00; 6 Dover, $16.50; 11 Dover, $28.75; 12 Dover, $25.50; 3 Raleigh, $11.64; 4 N. Raleigh, $20.00; 4 S. Raleigh, $33.00; 8 Raleigh, $50.00; 10 Raleigh, $33.75; 12 Raleigh, $26.00; 13 Raleigh, $12.00; U. 4 Raleigh, $25.00; U. 6 Raleigh, $25.00. 2 Romney, $15.00; 4 Tilbury E., $3.33; 6 E. Tilbury, E., $14.00; 6 W. Tilbury, E. $15.00; 7 Tilbury, E. $21.02; U. 2 Tilbury E., $28.50	560 99	219 75
Lambton, W	15 Sombra, $13.91	13 91	6 95
Lanark	12 Bathurst, $21.15; 5 Bathurst, $12.75; 11 Drummond, $15.00; 10 Lanark, $40.00; 3 Ramsay, $15.00; 6 and 7 Ramsay, $12.19; 10 Ramsay, $10.00; 11 Ramsay, $40.00; 15 Ramsay, $40.00	206 09	72 48
Leeds, 1	4 Leeds and Lansdowne Rear, $30.00	30 00	10 00
Leeds, 2	4 Elizabethtown, $20.25; 7 Elizabethtown, $20.08; 21 Elizabethtown, $20.00; 2 Kitley, $20.00; 10 Kitley, $20.53; 11 Kitley, $21.51; 18 Kitley, $20.00 2 and 3 Yonge and Escott Front, $21.75; 4 Yonge and Escott Front, $20.00	184 12	90 00
Leeds, 3 and Grenville.	15 Edwardsburg, $20.44; 27 Edwardsburg, $15.35; 6 and 9 Edwardsburg, $21.00; 1 and 5 Oxford, $20.00, 8 Oxford, $20.00; 3 South Gower, $20.90	117 69	57 67
Lennox & Addington	3 Adolphustown, $11.50; 19 Camden, $11.42; 1 Ernestown, $14.55	37 47	18 73
Lincoln	U. 3 Louth, $26.00; 2 Louth, $20.00; 6 Louth, $20.00; 1 Louth, $22.40; 5 Niagara, $34.00	122 40	50 00
Middlesex, E.	4 London, $15.05; 17 London, $20.00; 22 London, $20.00; 13 W. Nissouri, $20.00; 3 Westminster, $20.00, 10 Westminster, $30.00	125 05	57 53
Middlesex, W	7 Caradoc, $27.24; 4 Ekfrid, $16.00; 6 Lobo, $21.71; 3 Mosa, $32.25; 7 Mosa, $30.57; U. 7 E. Williams, $18.35	146 12	57 17
Norfolk	3 Houghton, $8.00; U. 3 Townsend, $18.80; 3 Woodhouse, $10.00	36 80	18 40
Northumberland	11 and 12 Haldimand, $20.00; 10 Hamilton, $20; 16 and 18 Murray and Brighton, $31.31; 9 Murray and Brighton, $22.80	94 11	40 00
Ontario, N.	1 Brock, $20.00; 2 Brock, $20.00; U. 2 Brock, $20.00; 4 Brock, $20.00; 6 Brock, $20.00; 7 Brock, $20.00; 8 Brock, $20.00; 10 Brock, $20.00; 12 Brock, $20.00; 13 Brock, $20.00; 14 Brock, $20.00; 19 Brock, $20.00; 1 Mara, $20.00; 2 Mara, $30.00; 4 Mara, $20.00; 5 Mara, $20.00; 6 Mara, $20.00; 7 Mara, $20.00; 8 Mara, $20.00; 9 Mara, $20.00; 1 Rama, $20.00; 2 Rama, $20.00; 3 Rama, $20.00; U. 4 Rama, $20.00; U. 5 Rama, $20.00; Pro. Separate 1 Rama, $20.00; 1 Scott, $20.00; 2 Scott, $20.00; 4 Scott, $20.00; 5 Scott, $20.00; 7 Scott, $20.00; 8 Scott, $20.00; 9 Scott, $10.00; 1 Thorah, $20.00; 2 Thorah, $20.00; 5 Thorah, $60.00; 3 Uxbridge, $20.00; 4 Uxbridge, $20.00; 5 Uxbridge, $20.00; 6 Uxbridge, $20.00; 7 Uxbridge, $20.00; 9 Uxbridge, $20.00; 12 Uxbridge, $20.00	900 00	125 00

APPENDIX C.—*Concluded.*

Inspectorate.	Name of school (section number and township, and amount expended for books recommended, during the academic year.	Total amount expended for books recommended.	Total Government grant.
		$ c.	$ c.
Oxford	5 Blandford, $23.39; 6 Dereham, $20.42; 1 E. Nissouri, $17.00; 11 E. Nissouri, $23.00; 3 and 5 W. and N. Oxford, $20.00; 6 E. Zorra, $20.46; 3 E. Zorra, $29.00; 9 E. Zorra, $39.75; 10 W. Zorra, $21.00	214 02	88 ..
Peel	3 Caledon, $10.34; 12 Caledon, $14.78; 14 Caledon, $20.00; 5 Toronto, $42.75	87 87	32 56
Perth	3 Blanshard, $25.00; 8 Blanshard, $28.55; 3 Downie, $20.00; 5 Downie, $23.00; 8 Downie, $20.00 U. 1 N. Easthope, $20.00; U. 6 N. Easthope, $20.00; 7 N. Easthope, $20.00; U. 8 N. Easthope, $34.00; 4 S. Easthope, $20.00, 9 Ellice, $10.25; U. 4 Elma, $20.54; U. 5 Fullarton, $24.93; 5 Hibbert, $23.75; 9 Logan, $20.39; 4 Logan, $220.28; 3 Mornington, $60.00; 5 Mornington, $20.00; U. 9 Mornington, $20.00; U. 3 Wallace, $20.00; 5 Wallace, $20.00; 6 Wallace, $13.77	509 46	214 50
Peterborough	3 Dummer, $27.86; 4 Otonabee, $41.50	69 36	20 00
Prince Edward	12 Sophiasburg, $20.00	20 00	10 00
Simcoe, E. and W. Muskoka	5 Oro, $21.49; 8 Oro, $10.00; 13 Oro, $21.00; 17 Tay, $23.25; 4 Medonte, $17.46; 14 Medonte, $20.00; 6 Monck, $5.75; 8 Monck, $42.00; 5 Stisted, $10.00; 2 Watt, $10.00	180 95	76 61
Simcoe, S. W.	10 Innisfil, $22.00; 8 Tecumseth, $10.00; 1 Tossorontio, $24.00	56 00	25 00
Victoria, E.	1 Ops, $13.35	13 35	6 67
Waterloo	16 Wellesley, $20.06	20 06	10 00
Welland	12 Wainfleet, $11.48	11 48	5 74
Wellington, S.	13 Erin, $28.10; 5 Guelph, $30.00; 6 Guelph, $20.92	79 02	30 00
Wentworth	2 Ancaster, $20.00; 5 Ancaster, $22.19; 10 Ancaster, $20.00; 11 Ancaster, $27.00; 15 Ancaster, $10.00; 3 Barton, $20.00; 4 Barton, $20.00; 9 Beverly, $22.73; 10 Beverly, $20.00; 13 Beverly, $10.00; 6 Flamboro E., $32.00; 4 Flamboro W., $20.33; 5 Flamboro W., $20.43; 6 Flamboro W., $15.16; 8 Flamboro W., $16.00; 3 Saltfleet, $20.00; 10 Saltfleet, $15	330 81	153 08
York, S.	22 York, $12.38; 25 York, $21.06	33 44	16 19
R. C. Separate Schools, W. Ontario	3 Holland, $10.60; 2 Sandwich E., $38.18; 1 Sandwich E., $92.84; 7 Sydenham, $90.60	147 22	30 60
R. C. Separate Schools, E. Ontario	16 Cornwall, $45.60	45 60	10 00
	Totals (320 Libraries)	6,889 02	2,894 22

APPENDIX D.—*INSPECTION OF SCHOOLS.*

I—List of Inspectors, 1903.

Public School Inspectors.	Jurisdiction.	Post Office.	Salary (travelling expenses included in some cases) for 1902.
			$ c.
T. W. Standing, B.A.	Brant: Town of Paris	Brantford	1,110 00
W. S. Clendenning	Bruce, East: Towns of Walkerton, Wiarton: Villages of Chesley, Tara	Walkerton	1,400 00
W. J. Chisholm, M.A.	Bruce, West; Town of Kincardine; Villages of Lucknow, Paisley, Port Elgin, Southampton, Teeswater, Tiverton	Kincardine	1,378 75
Robert H. Cowley, B.A.	Carleton: Villages of Hintonburg, Ottawa East, Richmond	Ottawa	1,645 00
Nathaniel Gordon	Dufferin, Town of Orangeville; Villages of Grand Valley, Shelburne	Orangeville	1,160 00
Arthur Brown	Dundas; Villages of Chesterville, Iroquois, Morrisburg, Winchester	Morrisburg	1,075 00
W. E. Tilley, M.A., Ph.D.	Durham and S. Monaghan Tp.: Towns of Bowmanville, Port Hope; Villages of Millbrook, Newcastle	Bowmanville	1,550 00
Welbern Atkin	Elgin; Town of Aylmer; Villages of Dutton, Port Stanley, Springfield, Vienna	St. Thomas	1,150 00
D. Cheney	Essex, North (No. 1): Town of Sandwich; Village of Belle River	Windsor	1,000 00
D. A. Maxwell, B.A., LL.B., Ph.D.	Essex, South (No. 2); City of Windsor; Towns of Amherstburg, Essex, Kingsville, Leamington, Walkerville	Windsor	1,682 00
Wm. Spankie, M.D.	Frontenac; Villages of Garden Island, Portsmouth	Kingston	1,540 00
Donald McDiarmid, M.D.	Glengarry; Town of Alexandria; Villages of Lancaster, Maxville	Maxville	1,015 00
Andrew Grier	Grey, East; Town of Thornbury	Thornbury	949 00
H. H. Burgess, B.A.	Grey, West; Town of Owen Sound	Owen Sound	1,300 00
N. W. Campbell	Grey, South; Towns of Durham, Meaford; Villages of Dundalk, Hanover, Markdale	Durham	1,375 00
Clarke Moses	Haldimand; Town of Dunnville; Villages of Caledonia, Cayuga, Hagersville	Caledonia	1,210 00
Sylvanus Phillips, B.A.	Haliburton; North East Muskoka, South Nipissing, East Parry Sound; Town of Huntsville; Villages of Burk's Falls, Sundridge	Minden	1,637 00
J. S. Deacon	Halton; Towns of Milton, Oakville; Villages of Acton, Burlington, Georgetown	Milton	1,400 00
William Mackintosh	Hastings, North; Villages of Madoc, Marmora, Stirling.	Madoc	1,316 25
John Johnston	Hastings, South; City of Belleville; Towns of Deseronto, Trenton; Village of Tweed	Belleville	1,635 00
David Robb	Huron, East (N.): Towns of Clinton, Seaforth, Wingham; Villages of Blyth, Brussels, Wroxeter	Brussels	1,397 35
J. Elgin Tom	Huron, West (S.); Town of Goderich; Villages of Bayfield, Exeter, Hensall	Goderich	1,490 00
Rev. W. H. G. Colles	Kent, East; Towns of Blenheim, Bothwell, Ridgetown; Village of Thamesville	Chatham	1,040 00
Robert Park	Kent, West; City of Chatham, Towns of Dresden, Wallaceburg; Village of Tilbury	Chatham	1,540 00
C. A. Barnes, M.A.	Lambton, East (No. 2); Town of Petrolea; Villages of Alvinston, Arkona, Oil Springs, Watford	Petrolea	1,421 00
D. D. Moshier, B.A., B. paed.	Lambton West (No. 1): Towns of Forest, Sarnia: Villages of Point Edward, Thedford, Wyoming	Sarnia	1,380 00
F. L. Michell, M.A.	Lanark; Towns of Almonte, Carleton Place, Perth, Smith's Falls; Village of Lanark	Perth	1,810 00
Wm. Johnston, M.A., LL.B.	Leeds and Grenville, No. 1; Town of Gananoque; Village of Newboro'	Athens	1,150 00
Robert Kinney, M.D.	Leeds and Grenville, No. 2; Village of Athens	Brockville	1,050 00
T. A. Craig	Leeds and Grenville, No. 3; Town of Prescott; Villages of Cardinal, Kemptville, Merrickville	Kemptville	1,120 00
Frederick Burrows	Lennox and Addington; Town of Napanee; Villages of Bath, Newburg	Napanee	1,380 00
W. W. Ireland, B.A.	Lincoln; Town of Niagara; Villages of Beamsville, Grimsby, Merritton, Port Dalhousie	St. Catharines	1,385 00
P. J. Thompson, B.A.	Middlesex, East; Village of Lucan	London	1,290 00
H. D. Johnson	Middlesex, West; Towns of Parkhill, Strathroy; Villages of Ailsa Craig, Glencoe, Newbury, Wardsville.	Strathroy	1,200 00
J. J. Wadsworth, M.A., M.B.	Norfolk; Town of Simcoe; Villages of Delhi, Port Dover, Port Rowan, Waterford	Simcoe	1,480 00
Albert Odell	Northumberland; Town of Cobourg; Villages of Brighton, Campbellford, Colborne, Hastings	Cobourg	1,530 00
James McBrien	Ontario, North. Town of Uxbridge; Villages of Beaverton, Cannington, Port Perry	Prince Albert	990 00
John Waugh, B.A., D. Paed.	Ontario, South; Towns of Oshawa, Whitby	Whitby	1,010 00
William Carlyle	Oxford, City of Woodstock; Towns of Ingersoll, Tillsonburg; Villages of Embro, Norwich	Woodstock	1,585 00

I.—List of Inspectors, 1903—*Continued*

Public School Inspectors.	Jurisdiction.	Post Office.	Salary (Travelling expenses included in some cases) for 1902.
			$ c.
Allan Embury	Peel; Town of Brampton; Villages of Bolton, Streetsville	Brampton	1,202 00
William Irwin, B.A	Perth; Towns of Listowel, Mitchell, St. Mary's; Village of Milverton	Stratford	1,617 80
J. C. Brown	Peterborough; Villages of Ashburnham, Havelock, Lakefield, Norwood	Peterborough	1,330 00
W. J. Summerby	Prescott and Russell; Towns of Hawkesbury, Vankleek Hill; Villages of Casselman, L'Orignal, Rockland	Russell	1,207 50
G. D. Platt, B.A	Prince Edward; Town of Picton; Village of Wellington	Picton	960 00
R. G. Scott, B.A	Renfrew; Towns of Arnprior, Pembroke, Renfrew; Villages of Cobden, Eganville	Pembroke	2,342 00
J. C. Morgan, M.A	Simcoe, North; Towns of Barrie, Midland, Orillia, Penetanguishene; Village of Creemore	Barrie	1,457 50
Rev. Thomas McKee	Simcoe, South West; Towns of Alliston, Stayner; Villages of Beeton, Bradford, Tottenham	Barrie	1,375 00
Isaac Day, B.A	Simcoe, East and West Muskoka; Town of Gravenhurst; Village of Port Carling	Orillia	1,449 90
Alexander McNaughton	Stormont; Town of Cornwall	Cornwall	1,150 00
J. H. Knight	Victoria, East; Town of Lindsay; Villages of Bobcaygeon, Omemee	Lindsay	791 75
*W. H. Stevens, B. A	Victoria, West, and South-East Muskoka; Town of Bracebridge; Villages of Fenelon Falls, Woodville	Lindsay	1,462 75
Thomas Pearce	Waterloo; Towns of Berlin, Galt, Hespeler, Preston; Villages of Ayr, Elmira, New Hamburg	Berlin	2,260 00
J. H. Ball, M. A	Welland; Towns of Niagara Falls, Thorold, Welland; Villages of Bridgeburg, Chippewa, Fort Erie, Niagara Falls South, Port Coborne	Welland	1,280 00
David Clapp, B. A	Wellington, North; Towns of Harriston, Mount Forest, Palmerston; Villages of Arthur, Clifford, Drayton	Harriston	1,100 00
J. J. Craig, B. A	Wellington, South, Villages of Elora, Erin, Fergus	Fergus	1,100 00
J. H. Smith	Wentworth; Town of Dundas; Village of Waterdown	Hamilton	1,270 00
A. B. Davidson, B. A	York, North; Towns of Aurora, Newmarket; Villages of Holland Landing, Richmond Hill, Sutton	Newmarket	1,060 00
David Fotheringham	York, South; Towns of East Toronto, North Toronto, Toronto Junction; Villages of Markham, Stouville, Weston, Woodbridge	Toronto	1,520 00
*John Ritchie	Districts of Thunder Bay, Rainy River; Towns of Fort Frances, Fort William, Port Arthur, Rat Portage	Port Arthur	
Donald McCaig	District of Algoma; Towns of Collingwood, Sault Ste. Marie	Collingwood	2,053 61
Rev. Geo. Grant, B. A	Districts of North Nipissing and West Parry Sound; Towns of Copper Cliff, Mattawa, North Bay Parry Sound, Sturgeon Falls, Sudbury	Orillia	1,812 00
Wm. Houstan, M. A	Manitoulin Island, etc.; Towns of Gore Bay, Little Current, New Liskeard, Thessalon	Toronto	1,640 00
M. J. Kelly, M.D., LL.B	City of	Brantford	400 00
Wm. Tytler, B. A	"	Guelph	600 00
W. H. Ballard, M. A	"	Hamilton	2,200 00
W. G. Kidd	"	Kingston	1,400 00
W. J. Carson	"	London	1,585 00
John C. Glashan, LL. D	"	Ottawa	2,000 90
J. B. Grey	"	St. Catharines	400 00
S. Silcox, B. A., D. Paed	Prin. Co. Model School, City of	St. Thomas	1,200 00
J. Russell Stuart	"	Stratford	1,100 00
James L. Hughes	City of	Toronto	3,300 00
W. F. Chapman	"	"	2,250 00
John Connolly	Town of	Brockville	900 00
Duncan Walker, B. A	"	Peterborough	1,200 00
Thomas Hilliard	"	Waterloo	80 00
		Total	101,933 76

* Appointed in 1903.

I. List of Inspectors, 1903.—*Concluded.*

Other Inspectors.	Post Office.	Salary, 1902.	Travelling expenses paid 1902.	Total.	—
		$ c.	$ c.	$ c.	$ c.
Separate School Inspectors :					
Wm. Prendergast, B. A.	Toronto	1,700 00	381 20	2,081 20	
Michael O'Brien	Peterborough	1,700 00	569 95	2,269 95	
John F. Power, M. A.	London	*2,000 00	*300 00	*2,300 00	
Inspector of Bilingual Training and Elementary Schools :					
Telesphore Rochon, B. A.	Clarence Creek	1,500 00	287 45	1,787 45	
Inspector of Technical Schools :					
Albert H. Leake	Toronto	†375 00	.....	375 00	
County Model School Inspector					
John J. Tilley	Toronto	1,850 00	427 35	2,277 35	
High School Inspectors :					
John E. Hodgson, M. A.	Toronto	2,750 00	400 00	3,150 00	
John Seath, B. A., LL.D	Toronto	2,750 00	510 76	3,260 76	
Total					17,501 71
Grand Total					119,435 47

*Jas. F. White's salary and expenses, 1902.

†Three month's Salary.

II.—Diplomas for School Premises, 1903.

Name of Inspector.	Jurisdiction.	No. of schools reported as receiving diplomas in 1903.	Name of Inspector.	Jurisdiction.	No. of schools reported as receiving diplomas in 1903.
W. E. Tilley	Durham	7	Chas. A. Barnes	Lambton, E.	15
N. W. Campbell	Grey, S.	36	P. J. Thompson	Middlesex, E.	40
H. H. Burgess	Grey, W.	12	H. D. Johnson	Middlesex, W.	7
D. Robb	Huron, E.	18	Wm. Irwin	Perth	17
J. Elgin Tom	Huron, W.	20	Thos. Pearce	Waterloo	19
Robert Park	Kent, W.	43	J. H. Smith	Wentworth	25
D. D. Moshier	Lambton, W.	6	D. Fotheringham	York, S.	5

APPENDIX E.—*CONTINUATION CLASSES, 1902-1903.*

Inspectorate.	Name of Principal and Degree.	Professional Certificate.	No. of Teachers.	Name of School.	No. of pupils.	Class of School. A	B	C	D
Brant	Arthur E. Green	I	4	S. Dumfries	19	1			
	John Hicks	II	2	Burford	11			1	
	Emilie R. Thomas	II	1	Burford	7				1
	Ida J. Tovell	II	1	S. Dumfries	3				1
Bruce, E.	R. D. McMurchy, B.A.	I	9	*Chesley Village	69	1			
	J. W. Ward	II	3	Carrick	19		1		
Bruce, W.	E. U. Dickenson, B.A.	I	7	†Paisley Village	48	1			
	Jos. Stalker	II	5	Lucknow Village	37		1		
	J. H. Cunningham	I	5	Teeswater Village	56	1			
	H. E. Fair	II	1	Kinloss	5			1	
	Geo. Bielby	I	3	Tiverton Village	11		1		
	Wm. H. Downey	I	1	Culross	7			1	
	Rich. D. Lane	III	1	Kinloss	6			1	
	Phemia McDonald	II	1	Kinloss	3				1
	John T. Kidd	II	7	Bruce	3				1
	John H. Young	III	1	Bruce	4				1
	Kenneth J. Beaton	III	1	Culross	3				1
	Minnie McNaughton	II	1	Culross	3				1
	James McPherson	I	1	Huron	12				1
	Minnie R. Hanna	III	3	Huron	4				1
Carleton	Mary D. Harkness	I	1	Osgoode	29	1			
	Robert J. Brown	I	3	Hintonburg Village	15	1			
	Wm. King	II	2	Fitzroy	8				
	Howard Gordon	III	1	N. Gower	7			1	
	Jennie Burnett	II	3	Nepean	7			1	
	Jessie Potter	II	1	Goulburn	4				1
	Mary Casey	II	1	Nepean	3				1
Dufferin	B. E. Thackeray, B.A.	I	5	Grand Valley Vil.	12	1			
	T. E. Langford, M.A.	I	7	†Shelburne Village	49	1			
	Wm. E. Bain	II	2	Melancthon	12			1	
	Wm. Heath	II	2	Mono	11			1	
	Mama Treadgold	III	1	Mulmur	4				1
Dundas	Hiram B. Fetterly	I	7	Winchester Village	38	1			
	Alice E. Timberlake	I	5	Chesterville Village	38	1			
	Horatio Loucks	I	4	Winchester	31	1			
	Harold C. Fader	II	2	Mountain	11			1	
	Eli Robinson	II	2	Mountain	8			1	
	John A. Shaver	II	2	Williamsburg	4				1
	Gideon O. Barkley	III	2	Winchester	6				1
	David L. Collison	II	2	Williamsburg	9				1
Durham, etc	D. Hampton	II	4	Millbrook Village	40	1			
	Arthur A. McRoberts	II	1	S. Monaghan	5			1	
	Edwin Mitchell	II	1	Manvers	8			1	
	Miss I. L. Preston	II	1	Manvers	5			1	
	A. W. Bradburn	II	2	Manvers	5			1	
	Miss E. Sexsmith	II	1	Darlington	4				1
	W. J. Inch	II	1	Clarke	7				1
	Miss B. Fair	II	1	Cavan	3				1
Elgin	F. Tanton	I	4	Aldborough	32	1			
	Henry Wing	I	4	Aldborough	26	1			
	George Stewart	II	3	Springfield Village	33	1			
	George Dale	II	3	S. Dorcheste4	10		1		
	J. W. Brown	II	2	Southwold	20		1		
	John McFadyen	II	2	Southwold	20		1		
	Edward Witty	II	2	Port Stanley Village	11		1		
	James Amoss	II	2	Bayham	2			1	
	George Priddle	II	2	Bayham	7			1	
	Jean Anderson	II	1	Aldborough	7				1
	Ellie McEachran	I	1	Aldborough	7				1
	Mary Hutton	II	1	Bayham	4				1
	Burton Robinson	III	1	Dunwich	4				1
	Flora Kerr	III	1	Dunwich	4				1
	Henrietta McRae	II	1	Dunwich	3				1
	Arthur Curtis	II	2	Dunwich	3				1
	Nellie Harris	II	1	Malahide	4				1
	Jessie Arnup	III	1	Malahide	3				1
	Maggie McLennan	III	1	Southwold	3				1
	John C. McLennan	III	1	Southwold	3				1
	Percy Lewis	III	1	Yarmouth	3				1
	F. H. Langford	III	1	Yarmouth	3				1
	Edna Fowler	III	1	Yarmouth	4				1
Essex, N	Nellie Moynahan	II	2	S. Sandwich	6				1
Essex, S	S. M. Sealey, B.A.	I	5	*Tilbury W.	25	1			
	Agnes Johnston	I	7	*Amherstburg Town	35	1			
	Fred. J. Voaden	II	7	Kingsville Town	20		1		
	Wm. J. Elliott	I	3	Colchester, S	10		1		
	J. H. Madill	II	1	Colchester, S	10			1	
	Wm. H. McGuirl	III	1	Gosfield, N	3				1

* Three teachers doing Continuation Class work only. † Two teachers doing Continuation Class work only.

Appendix E.—*Continued.*

Inspectorate.	Name of Principal and Degree.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School. A	B	C	D
Frontenac	Roy F. Fleming	II	2	Garden Island Vill.	4				1
	Della Snyder	III	1	5 Hinchinbrook	3				1
	Edith Barr	T.	1	U S Loughboro	3				1
Glengarry	George Steer	I	3	Maxville Village	13			1	
Grey, E.	David McK. Forrester	I	2	13 Collingwood	5			1	
	J. B. Gillesby	I	4	Thornbury Town	5			1	
	A. J. Fries	III	1	U 1 Euphrasia	3				1
Grey, S	T. Allan	I	7	* Durham Town	55	1			
	J. E. Coombes	I	7	Hanover Village	34	1			
	Jas. S. Rowe	II	4	Markdale Village	17		1		
	J. E. Fawcett	II	3	5 Artemesia	17		1		
	W. J. Blakeston	II	3	Dundalk Village	18		1		
	S. Mac. Eastman	III	2	U 12 Artemesia & Glenelg	3				1
	Alex. Reid	II	1	3 Artemesia	3				1
	J. W. Firth	III	1	3 Glenelg	3				1
	T. F. Andrews	II	1	9 Osprey	5				1
Grey, W.	A. B. Cooper	I	1	U 1 Holland & Sullivan	12			1	
	Bertha Shaw	III	1	2 Sarawak	53				1
Haldimand	Dawson F. Aiken	I	4	10 Walpole	22	1			
	J. L. Michener, B.A.	II	2	3 Walpole	16		1		
	Alice Martin	II	1	2 Walpole	6			1	
	Clarence D. Bouck	I	1	15 Walpole	5			1	
	Harriette King	III	1	4 Oneida	5			1	
	Maggie Kenney	II	2	1 Walpole	3				1
	E. Burton Mealley	III	2	14 Walpole	3				1
	Kate Smith	II	1	16 Walpole	4				1
	Letta V. Curtis	III	1	1 Rainham	3				1
	Wm. J. Neale	II	2	5 N. Cayuga	3				1
Haliburton, etc.	A. C. Bernath	I	8	Huntsville Town	19	1			
	R. G. Irvine	I	5	Burk's Falls Village	26	1			
	T. W. Kidd	I	3	2 Machar	5			1	
	D. T. Walkam	III	3	8 S. Himsworth	5			1	
	W. I. Stevenson	I	3	1 Anson	5			1	
	W. R. Cummings	II	2	6 S. Himsworth	3				1
	R. C. Black	II	1	10 Chaffey	3				1
	John Maxwell	II	2	Sundridge Village	3				1
Halton	Wm. F. Inman	I	7	*Milton Town	51	1			
	Millie Dingman	I	6	*Acton Village	34	1			
	F. T. Richardson	I	1	Burlington Village	12				1
	Wm. J. McClenahan	II	1	3 Nelson	4				1
	John Luscombe	II	1	13 Trafalgar	6				1
	Dollie T. Elliott	II	1	1 Esquesing	4				1
Hastings, N.	E. T. Williams	II	4	Marmora Village	8			1	
Hastings, S.	John Bell	II	1	Tweed Village	11		1		
	O. S. Hicks	II	2	2 Sidney	6			1	
	J. E. Chambers	II	1	3 Hungerford	9			1	
	W. S. Nobs	II	2	17 Thurlow	10			1	
	W. A. Black	II	2	11 Sidney	4				1
	M. W. Mott	II	2	12 & 14 Thurlow	1				1
	E. O. Platt	I	1	18 Thurlow	1				1
	R. A. Morton	II	2	1 Hungerford	4				1
Huron, E.	A. H. Musgrove	II	9	*Wingham Town	80	1			
	I. H. Cameron	I	6	*Brussels Village	78	1			
	J. J. Bailey	I	4	Blyth Village	24	1			
	John Hartley	II	2	Wroxeter Village	12			1	
	Dan L. Strachan	I	2	7 Howick	7			1	
	Geo. Dobson	II	2	11 Grey	6			1	
	Wm. Watters	II	2	17 Howick	7			1	
	Lizzie Calder	II	2	7 Grey	3				1
	Marjorie Gillespie	II	1	5 Howick	5				1
	Jessie Wiseman	III	2	8 Hullett	6				1
	Chris. White	II	1	7 McKillop	4				1
	Lizzie Kinney	II	1	12 McKillop	3				1
	Robt. Jas. Beatty	II	1	5 Tuckersmith	4				1
	Thos. G. Shillinglaw	II	1	9 Tuckersmith	3				1
	Belle Pearson	II	1	8 Turnberry	5				1
Huron, W.	H. N. Anderson	I	8	*Exeter Village	16	1			
	Wm. McKay	II	3	Hensall Village	10			1	
	Frederick Ross	II	1	4 Ashfield	5			1	
	Walter B. Hawkins	II	1	9 Ashfield	6			1	
	W. L. Hackett	III	1	10 Ashfield	5			1	
	Wm. N. Courtice	III	1	16 Ashfield	8			1	
	Wm. Geiger	II	3	16 Stephen	8			1	
	Claude Bluett	II	3	5 Stephen	9			1	
	Annie M. Clark	II	1	3 W. Wawanosh	5			1	
	Henry I. Moorish	II	1	6 E. Wawanosh	5			1	
	Thos. G. Allen	II	2	8 Ashfield	7				1

* Two teachers doing Continuation Class work only.

APPENDIX E.—*Continued*

Inspectorate.	Name of Principal and Degree.	Professional Certificates.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School.			
						A	B	C	D
Huron, W.—*Continued.*	Allan Bowles	II	1	13 Ashfield	7				1
	Malcolm McDowell	III	1	2 Colborne	5				1
	Lizzie M. Trudgeon	II	1	1 Goderich	3				1
	Sara J. Bell	I	1	2 Goderich	3				1
	Robt. F. Stelck	III	3	7 Hay	7				1
	Geo. S. Howard	II	1	9 Stanley	3				1
	A. E. Aikenhead	III	2	10 Stanley	8				1
	Wm. H. Johnston	II	1	14 Stanley	3				1
	John A. McNaughton	II	2	1 Stephen	4				1
	Maude A. Horton	II	1	1 Usborne	3				1
	Robt. J. Hamilton	II	1	4 Usborne	4				1
	Chas. A. Tebbutt	II	1	4 W. Wawanosh	6				1
	Lillian Robinson	III	1	16 E. Wawanosh	3				1
Kent, E.	John E. Anderson	I	8	Blenheim Town	28	1			
	Henry Kelly, B.A.	II	4	Bothwell Town	27	1			
	J. G. Cameron	II	4	Thamesville Village	32	1			
	J. D. Campbell	I	4	6 Orford	30	1			
	Lizzie Noack	II	1	13½ Harwich	6			1	
	Grant Nablo	III	1	8 Harwich	6			1	
	Flora Campbell	II	1	6 Harwich	10			1	
	Emma Bottoms	I	1	1 Howard	5			1	
	Duncan Johnston	II	1	2 Howard	7			1	
	Lotti. Galloway	III	1	13 Howard	6			1	
	Margt. Scurrah	II	1	8 Camden	6			1	
	Ollie M. Drewery	II	2	2½ Harwich	4				1
	Stella Rowe	II	1	9 Harwich	3				1
	Jas. R. Newkirk	II	1	9 Harwich	3				1
	Jas. E. Stevenson	II	1	11 Harwich	4				1
	Mabel Doherty	I	1	16 Harwich	3				1
	Bert McBrien	III	1	5 Camden	4				1
	J. E. Caldwell	II	2	3 Orford	3				1
	Jenny L. Russell	III	1	10 Orford	3				1
Kent W.	G. A. Miller	I	8	Dresden Town	43	1			
	E. E. Dadson	I	10	*Wallaceburg Town	80	1			
	Jessie Ferguson	II	2	9 Chatham	20		1		
	W. C. Dainty	II	3	U. 4 Romney	21		1		
	Angus McLean	III	2	U. 5 Raleigh	13		1		
	I. S. McAllum	II	3	Tilbury Village	14		1		
	Carrie M. Rowe	II	1	6 Chatham	6			1	
	Beatrice Boulton	III	2	12 Chatham	10			1	
	Wm. J. Walsh	III	1	6 Dover	6			1	
	Gordon Griffin	II	1	11 Dover	8			1	
	Harry M. Fleming	III	1	5 Raleigh	10			1	
	Maggie McIsaac	II	1	7 Raleigh	6			1	
	Elizabeth Patterson	II	1	13 Raleigh	8			1	
	Wm. S. Bell	II	1	U. 6 Raleigh	7			1	
	C. Ross McNeil	III	1	2 E. Tilbury E.	5			1	
	Rodger Hutchinson	III	1	3 E. Tilbury E.	6			1	
	Lizzie Wilson	II	2	5 E. Tilbury E.	8			1	
	Lulu Palmer	III	1	8 Tilbury E.	5			1	
	Dora McKerral	III	1	8 Chatham	3				1
	Ethel Meekle	III	1	14 Chatham	3				1
	Nettie McKnight	II	1	U. 1 Chatham	3				1
	Bertie Robinson	III	1	12 Chatham	4				1
	Cora C. Doyle	III	1	U. 3 Raleigh	3				1
	C. W. Prowd	III	1	2 Romney	3				1
	Allie Estabrook	III	1	2 W. Tilbury E.	3				1
	Cassie M. Hill	II	1	4 Tilbury E.	4				1
Lambton, E., No. 2	D. Hicks, B.A.	I	3	Alvinston Village	37	1			
	Lesbie Cumberland	I	6	Oil Springs Village	29	1			
	Jas. J. Wilson	II	2	17 Enniskillen	7			1	
	Benj. J. Palmer	II	2	Arkona Village	5			1	
	J. A. Campbell	II	1	15 Warwick	3				1
Lambton, W., No. 1.	Neil McLean	II	3	Wyoming Village	5			1	
	Geo. J. Bayer	III	2	8 Moore	5			1	
	Angus D. MacPherson	III	1	3 Enniskillen	5			1	
	R. [illegible]	III	1	8 Enniskillen	5			1	
	[illegible]	III	1	13 Sombra	3				1
	[illegible]	II	3	11 Moore	3				1
	[illegible]	II	1	[illegible]	5				1
Lanark	[illegible]	II	3	Lanark Village	37	1			
	[illegible]	II	2	4 Pakenham	25		1		
	R. W. Mathewson	III	1	Burgess, N.	3				1
	Mrs. E. J. [illegible]	II	2	12 Bathurst	3				1
	Miss L. [illegible]	II	1	Pakenham	4				1
	[illegible]	III	1	8 Montague	3				1
	[illegible]	II	2	11 Drummond	3				1
	[illegible]	III	1	3 Lavant	3				1

* [illegible] Collegiate Institute Class work only.

Appendix E.—*Continued.*

Inspectorate.	Name of Principal and Degree.	Professional Certificate.	No. of Teachers.	Name of School.	No. of pupils.	Class of School.			
						A	B	C	D
Leeds, No. 1	A. S. Mott	I	4	4 N. Crosby	13	1			
	W. D. Hannah	I	3	Newboro' Village	15		1		
	M. Foster	II	2	5 S. Crosby	6			1	
	W. Cauley	II	2	6 Bastard	6			1	
Leeds, No. 2	Nina Buell	I	2	7 Elizabethtown	3				1
	Ethel Richards	II	2	11 Kitley	4				1
Leeds and Grenville	Thos. N. Lewis, B.A.	I	5	*Merrickville Village.	37	1			
	J. Herford Steer	III	2	17 Augusta	5			1	
	J. E. Burchill	II	2	15 Edwardsburgh	10			1	
	Wm. J. McLachlan	II	2	1 and 5 Oxford	4				1
	Bertie Agnew	II	1	17 Oxford	3				1
Lennox & Addington	W. H. Stewart	I	3	Bath Village	34	1			
	A. Stevenson	III	1	4 Amherst Island	4				1
	Emily Montray	III	1	1 Amherst Island	6				1
	A. A. McQuarrie	II	1	19 Ernesttown	4				1
	J. W. Wilson	III	1	4 S. Fredericksburg	4				1
Lincoln	Bertha Addy	III	1	9 S. Grimsby	3				1
	Wm. Jamieson	III	1	8 Gainsboro	4				1
Middlesex, E	Jas. D. McDonald	II	2	4 N. Dorchester	8			1	
	Charlotte Vining	II	1	1 London	5			1	
	Miss S. McLellan	II	1	18 & 21 Westminster	7			1	
	F. W. Scott	II	2	2 Delaware	4				1
	Gertrude Howard	III	1	3 N. Dorchester	3				1
	Esther Heatly	II	2	7 N. Dorchester	3				1
	May E. Robson	II	1	16 N. Dorchester	3				1
	F. Henry Stanley	III	1	19 & 9 N. Dorchester	3				1
	Chas. F. Price	II	1	4 London	3				1
	Jas. Hillis	II	1	6 London	3				1
	Maggie M. Miller	III	1	16 London	3				
	Marion Porteous	II	2	17 London	3				1
	Martha Upshall	III	1	14 McGillivray	3				1
	Bella McMartin	II	1	2 Nissouri	3				1
	Flora McColl	II	1	10 Westminster	3				1
	Daniel McGregor	II	1	13 Westminster	3				1
	Olive McIntyre	III	1	14 Westminster	3				1
	Blanche Mills	I	1	17 Westminster	3				1
	Elsie Waugh	II	1	7 London	4				1
Middlesex, W	W. G. Robinson	II	2	U.16 Caradoc & Ekfrid	9			1	
	Melvin Payne	II	1	10 Lobo	7			1	
	C. J. Bradley	II	2	15 Caradoc	7			1	
	Sara Brodie	II	1	1 Ekfrid	3				1
	D. G. Galbraith	II	1	U. 8 Ekfrid & Mosa	4				1
	Mary McEachran	I	1	6 Ekfrid	4				1
	James Ramsay	III	1	3 Lobo	3				1
	Dan. J. McGugan	III	1	8 Lobo	4				1
	Clive Allin	III	1	U. 9 Lobo	4				1
	Frank Stidwell	II	1	U.17 Mosa and Ekfrid	3				1
	Geo. Glendinning	III	1	1 East Williams	4				1
	Edith M. Bogue	II	1	U. 7 E. Williams	4				1
	Peter McKishan	III	1	9 E. Williams	3				1
	Donald McPherson	II	1	U.16 W. Williams	3				1
Norfolk	J. A. Irwin	I	4	Delhi Village	16			1	
	T. W. McLean	II	2	6 Charlotteville	8			1	
	M. C. Scott	III	1	12 Townsend	8			1	
	Jas. S. Brown	III	1	7 Walsingham	6				1
	A. D. Hyde	III	1	23 Townsend	8				1
	Mary E. Jamieson	II	1	24 Townsend	4				1
	R. A. Catherwood	II	2	10 Wingham	4				1
Northumberland	E. J. Wethey, B.A.	I	4	2 Percy	39	1			
	Geo. A. Dawe	II	2	2 Alnwick	3				1
	J. H. Minaker	II	1	8 Percy	3				1
	A. S. Chapin	II	1	4 Cramahe	3				1
	John Mann	II	1	7 Hamilton	3				1
	Chas. H. Fenton	II	1	2 Haldimand	4				1
	Minnie Downs	III	1	9 Percy	3				1
Ontario, N	R. J. Johnston	II	4	Cannington Village	13		1		
	J. Givens	II	3	Beaverton Village	17		1		
	Miss J. M. Kelly	II	1	3 Mara	6			1	
	Wm. Fallowdowne	II	3	13 Brock	9			1	
	Kate Fox	II	1	7 Mara	5			1	
	John Ward	II	1	9 Mara	9			1	
	Eugene Richardson	II	2	5 Scott	6			1	
	Janey McDowel	III	1	3 Uxbridge	5				1
	Edward Blanchard	III	1	8 Scott	5				1
	Herbert Gillison	III	1	2 Brock	3				1
	Henry Hart	II	1	6 Brock	6				1
	Ida Arnott	III	1	1 Mara	3				1

* Two teachers doing Continuation Class work only.

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree.	Professional Certificate.	No. of Teachers.	Name of School.	No. of pupils.	Class of School.			
						A	B	C	D
Ontario, N.—*Continued*	Martha Cameron	II	1	2 Mara	3	....	....	....	1
	Marguerite Healy	II	1	6 Mara	3	....	....	....	1
	Nettie Kennedy	II	1	1 Thorah	3	....	....	....	1
	H. Lettie Black	II	1	5 Thorah	4	....	....	....	1
	Alice Davis	III	1	U. 4 Rama	4	....	....	....	1
Ontario, S	A. Lamon	II	1	10 Pickering	3	....	....	....	1
	Rose M. Wilson	I	2	8 Pickering	3	....	....	....	1
	Arvella Real	III	1	11 Reach	3	....	....	....	1
	G. D. Aird	III	1	5 Reach	3	....	....	....	1
Oxford	Geo. Pentland	I	5	Norwich Village	29	1	....	....	....
	Jas. W. Fraser, B. A	II	3	Embro Village	11	....	1	....	....
	C. W. Milburn	I	3	U.21 Blenheim	16	....	1	....	....
	H. E. Wicker	I	3	24 Blenheim	20	....	1	....	....
	C. A. Garthwaite	II	3	6 S. Norwich	12	....	1	....	....
	H. A. Glaspell	I	4	U.13 E. Zorrah	15	....	1	....	....
	P. H. Hendershott	II	2	U. 3 N. Norwich	5	....	....	1	....
	J. M. Scott	I	3	U. 5 E. Nissouri	7	....	....	1	....
	M. B. Hugill	II	2	5 Dereham	5	....	....	1	....
	D. A. McDonald	II	1	10 W. Zorra	5	....	....	1	....
	G. C. Smith	II	2	6 Dereham	3	....	....	....	1
	J. A. McDonald	II	1	6 E. Zorra	4	....	....	....	1
Peel	A. M. Burchell	I	4	Bolton Village	22	1	....	....	....
	Matthew Cree	II	2	15 Caledon	5	....	....	1	....
	Geo. M. Dix	II	2	U.21 Toronto	3	....	....	....	1
Perth	John B. Dunbar	I	3	Milverton Village	12	....	1	....	....
	Wm. W. Hart	III	1	3 Blanshard	7	....	....	1	....
	Albert E. Smith	II	2	4 N. Easthope	4	....	....	....	1
	Wm. Robertson	III	1	5 Elma	3	....	....	....	1
	L. Chester McRoberts	III	1	5 Fullarton	3	....	....	....	1
	Samuel Sample	II	2	3 Fullarton	5	....	....	....	1
	J. Wesley Mark	II	1	9 Blanshard	4	....	....	....	1
Peterborough	S. W. E. Hill	I	5	Lakefield Village	10	....	1	....	....
	D. L. Somerville	II	4	Havelock Village	6	....	....	1	....
	Thomas J. Wallace	II	2	4 Otonabee	8	....	....	1	....
Prescott and Russell	Sarah McLaughlin	II	2	2 Cumberland	5	....	....	1	....
	C. M. Rowe	II	2	Rockland Village	6	....	....	1	....
	S. A. Hitsman	I	3	2 Russell	7	....	....	....	1
	W. L. Summerby	III	2	5 Cumberland	4	....	....	....	1
	H. Shirreffs	III	1	1 Clarence	4	....	....	....	1
	Geo. H. Ashman	II	2	1 S. Plantagenet	7	....	....	....	1
	W. Bradley	III	1	4 Caledonia	5	....	....	....	1
	Nellie Watson	III	1	4 E. Hawkesbury	3	....	....	....	1
Prince Edward	W. K. Beech	III	2	Wellington Village	13	....	1	....	....
	Walter J. Osborne	I	2	7 Hallowell	12	....	....	1	....
	Frank B. Clarke	I	2	17 Hillier	7	....	....	1	....
	E. W. Ward	II	1	13 Hallowell	6	....	....	1	....
	J. Gallagher	III	1	11 S. Marysburg	5	....	....	1	....
	J. E. Benson	II	1	2 Ameliasburgh	4	....	....	....	1
	J. K. Osborne	III	1	13 Ameliasburgh	6	....	....	....	1
	Miss A. Colliver	III	1	12 Sophiasburgh	4	....	....	....	1
Renfrew	Wycliffe Trench, B.A	I	4	Eganville Village	23	1	....	....	....
	Geo. R. Wood	II	2	7 Westmeath	13	....	1	....	....
	Delia Benn	II	1	3 Admaston	6	....	....	....	1
	John Johnston, B.A	III	2	5 Bagot	8	....	....	....	1
	Margaret Armstrong	III	1	4 Ross	5	....	....	....	1
	Maud Greaves	II	2	6 Ross	6	....	....	....	1
	Charlie McMain	I	2	2 Westmeath	4	....	....	....	1
Simcoe, E. and West Muskoka	Archie Thompson	III	3	7 Medonte	4	....	....	....	1
	Maud Blair	III	1	1 Humphrey	3	....	....	....	1
	Thos. Tanton	II	1	6 Oro	4	....	....	....	1
	Annie McGuire	III	1	9 Stephenson	3	....	....	....	1
Simcoe, N	A. McKee	I	12	Midland Town	28	1	....	....	....
	Thos. Gowan	I	4	Creemore Village	12	1	....	....	....
	Geo. A. Clarke	I	4	5 Flos	15	....	1	....	....
	M. Johnstone	II	1	3 Sunnidale	9	....	....	1	....
	Philip Wishar	II	4	Penetanguishene T'n	14	....	1	....	....
	Ernest Seitch	II	2	3 Vespra	5	....	....	....	1
	D. J. Ritchie	II	1	14 Tiny	4	....	....	....	1
	Arthur M. Woodley	II	2	2 Oro	6	....	....	....	1
	Thos. Hindle	II	2	9 Vespra	5	....	....	....	1
Simcoe, S. W	A. J. Speers	I	6	*Alliston Town	46	1	....	....	....
	W. L. Kidd	I	6	*Stayner Town	34	1	....	....	....
	Thos. Elliott, B.A	I	4	*Tottenham Village	37	1	....	....	....
	Geo. A. Clark	I	4	*5 Essa	32	1	....	....	....
	J. A. MacPherson	II	4	*Beeton Village	25	1	....	....	....
	Jas. E. Holt	II	2	10 W. Gwillimbury	10	....	1	....	....
	John G. Christie	III	2	3 Nottawasaga	13	....	1	....	....

* Two teachers doing Continuation Claes work only.

Appendix E.—*Continued.*

Inspectorate.	Name of Principal and Degree.	Professional Certificate.	No. of Teachers.	Name of School.	No. of pupils.	Class of School. A	B	C	D
Simcoe, S.W.—*Con.*	Joseph H. Speers	III	2	7 Essa	12		1		
	Geo. Sutherland	II	2	13 Nottawasaga	11		1		
	Geo. L. Thompson	I	1	6 Essa	8			1	
	John M. McGuire	II	2	10 Essa	7			1	
	J. D. Cowles	II	1	4 Innisfil	9			1	
	D. J. Fraser	III	1	7 Innisfil	7			1	
	Eva Evans	II	1	5 W. Gwillimbury	6			1	
	Chas. Deering	II	2	10 Innisfil	5			1	
	Thos. Irwin	II	1	4 Tossorontio	6			1	
	Thos. Scott	II	1	8 Tossorontio	6			1	
	Kate O'Hara	II	1	4 Adjala	4				1
	Archie Creary	II	1	6 Adjala	3				1
	Willard Fife	III	1	1 Essa	3				1
	Roy S. Hamer	III	1	2 Essa	4				1
	Gertrude Steele	III	1	3 Essa	3				1
	Alfred G. Green	II	1	19 Tecumseh	4				1
	Geo. Wilson	II	1	5 Tossorontio	4				1
Stormont	Edith M. Adams	I	3	14 Roxborough	11	1			
	James Froats	I	3	3 Finch	14	1			
	R. A. Baker	III	3	4 Osnabruck	14		1		
	Geo. S. Mattice	II	1	9 Osnabruck	3				1
	Alice Young	II	1	6 Osnabruck	3				1
Victoria, E	Charles Ramsay	I	5	Bobcaygeon Village	18	1			
	Rupert Wager	II	1	8 Verulam & Fenelon	3				1
	Neil Q. McEachern	II	1	6 Ops	3				1
Victoria, W., etc	W. C. Shier, B.A.	I	10	*Bracebridge Town	44	1			1
	Ed. Mosgrove	II	2	8 Eldon	8			1	
	M. Wilson	II	2	Woodville Village	6			1	
	T. C. Birchard	II	2	U. 1 Bexley	8			1	
Waterloo	P. H. Huyck	I	4	New Hamburg Vil.	7			1	
	James Kerr	II	4	16 Wellesley	5			1	
	J. Corrigill	I	6	Elmira Village	4				1
	J. D. Ramsay	II	9	Hespeler Town	4				1
Welland	James Kirkwood	I	3	Fort Erie Village	15		1		
	Chas. E. Hansel	II	5	Bridgeburg Village	25		1		
	D. W. McKay	I	5	Pt. Colborne Village	14		1		
	W. H. Metcalf	II	3	11 Bertie	16		1		
	W. B. Buckner	III	2	5 Humberstone	8			1	
	Mabel M. Elliott	II	1	3 Pelham	6			1	
	A. Louise Bradley	I	2	9 Pelham	7			1	
	Emma C. Davison	II	1	6 Wainfleet	6			1	
Wellington, N	G. A. Campbell	II	4	Drayton Village	30	1			
	Douglas Forsyth	II	8	Palmerston Town	20	1			
	Mary Duncan	II	2	12 Maryboro'	12		1		
	Clarence Long	II	2	2 Peel	8			1	
	John A. Gray	II	3	Clifford Village	4				1
Wellington, S.	Robert D. Feheley	I	3	Erin Village	23	1			
	James A. Davidson	II	2	9 Eramosa	10			1	
	W. H. Rowan	II	2	6 Erin	6			1	
	Peter Yemen	II	2	7 W. Garafraxa	9			1	
	Fravilla Robinson	II	1	4½ Eramosa	4				1
	Olive Thomson	III	1	U 2 Erin	7				1
	Alex. H. McIntosh	III	1	6 Puslinch	4				1
	Sara Blyth	I	2	8 Puslinch	5				1
	James Armstrong	II	1	9 Puslinch	5				1
	W. L. Elvidge	II	1	6 W. Garafraxa	5				1
Wentworth	Charles H. Stuart	II	3	5 Ancaster	20		1		
	A. E. Wilcox	II	4	4 Saltfleet	12		1		
	Lillie Raycroft	III	2	3 Barton	6			1	
	James E. Stewart	II	2	7 W. Flamboro	8			1	
	Geo. D. Ralston	I	2	6 Ancaster	9			1	
	Annie Bell	II	2	11 Ancaster	4				1
	W. G. Patrick	III	1	6 Beverly	4				1
	Lizzie Winter	III	1	14 Beverly	3				1
	Ada H. Lewis	II	2	5 E. Flamboro	4				1
	Fanny A. Twiss	I	1	6 W. Flamboro	6				1
	R. E. Jamieson	III	2	9 W. Flamboro	10				1
York, N	J. W. Rymal, B.A	I	3	13 E. Gwillimbury	19	1			
	T. A. Colquhoun	I	3	14 King	20	1			
York, S	D. A. Carmichael	III	4	Woodbridge Village	27		1		
	Albert W. Urmy	II	2	16 Markham	4				1
Manitoulin, Algoma, etc	R. O. White	I	4	Gore Bay Town	36	1			
	F. H. Hurlburt	II	2	2 Assiginac (Manitowaning)	14			1	
	D. M. Christie	I	4	Bruce Mines Town	28	1			
	W. Argue	II	4	Thessalon Town	11			1	

* Two Teachers doing Continuation Class work only.

APPENDIX E.—*Concluded.*

Inspectorate.	Name of Principal and Degree.	Professional Certificate.	No. of Teachers	Name of School.	No. of Pupils.	Class of School.			
						A	B	C	D
Manitoulin, Algoma, etc.—*Continued*	R. D. Fleming	II	4	Little Current Town.	13	....	....	1	....
	Catherine G. Campbell	.....	1	1 Lefroy & Plummer	4	....	....	....	1
	George Evans	II	3	1 Schreiber	9	....	....	1	....
W. Parry Sound and N. Nipissing	A. M. Currie	I	12	*Parry Sound Town	59	1	....	....	....
	Wm. M. Bradley	I	7	Copper Cliff Town	13	....	1	....	....
	Wm. P. Hedley, B.A.	I	4	Sudbury Town	12	....	....	....	1
	Fred Pearen	I	4	Sturgeon Falls Town	7	....	....	....	1
	B. Cryderman	III	2	1 Chapman	4	....	....	....	1
	Etta Canning	II	1	1 McKellar	4	....	....	....	1
R. C. S. Schools, E. Ontario	Sr. St. Ernestine	.....	4	Eganville Village	35	1	....	....	....
	Sr. St Andrew	.....	3	4 N. Crosby	30	....	1	....	....
R. C. S. Schools, Central Ontario	M. J. McDonnell	II	5	Mattawa Town	7	....	....	1	....
	Thomas J. Ryan	II	1	10 Adjala	9	....	....	1	....
	Mary E. Breen	II	4	Sturgeon Falls Town	3	....	....	....	1
	Sr. Gertrude	.....	4	Sudbury Town	3	....	....	....	1
R. C. S. Schools, W. Ontario	Sister Ethelbert	.....	5	Amherstburg Town.	19	1	....	....	....
	Eugenie Crunican	II	1	6 Raleigh	6	....	....	1	....
	Annie Begley	II	1	5 Raleigh	3	....	....	....	1
Totals					4,864	65	48	134	233

* Two teachers doing Continuation Class work only.

APPENDIX F.—*PROCEEDINGS FOR THE YEAR 1903.*

I. REGULATIONS AND CIRCULARS.

INTERIM AMENDMENTS TO THE REGULATIONS.

(Approved July, 1903.)

Pending the complete revision of Departmental Regulations, the following modifications are made in the revised Regulations which came into force in June, 1901:

Public School Courses of Study.

Stenography and typewriting are now optional subjects for the Fifth Form of the Public Schools.

Junior Leaving Standing.

(1) As announced in July, 1902, there will be no examination for Public School Leaving or Part I Junior Leaving Standing.

(2) A Part II. Junior Leaving certificate will give full Junior Leaving Standing if endorsed and certified to by any High School Principal or Public School Inspector with a statement that the holder has taken the required course in all subjects (Geography, History, Drawing, Bookkeeping, Reading, etc.) for Part I Junior Leaving Standing.

(3) A candidate for Part II. Junior Leaving Standing who selects the Chemistry option may omit Latin; but he will be required, if he exercises this privilege, to obtain 60 per cent. on the total (Regulations 43 (3) and 46).

Junior and Senior Non-Professional Examinations for Public School Teachers' Certificates.

(1) After September, 1905, the course for the Junior Non-Professional examinations for Public School teachers will consist mainly of English and Mathematics with Science; and the standard for pass at the Departmental examinations thereon will be 40 per cent. of the marks assigned to each paper, and 60 per cent. of the aggregate of marks. As announced in July, 1902, Latin will no longer be obligatory for this grade of Public School Teachers; but candidates at the examinations therefor who take also the papers on the lower and middle school courses in Latin (the pass matriculation course) at the July departmental examinations of the same year and who make at least 34 per cent. on each of such Latin papers and 50 per cent. of the aggregate of the marks assigned to both papers (the grammar and prose and the authors papers) shall have the marks so obtained added as a bonus to their marks on the subjects of the Junior Non-Professional examinations for Public School Teachers' certificates.

(2) After September, 1905, the examinations in the course in Latin prescribed for the Upper School will be obligatory at the Senior Non-Professional examination for Public School Teachers, and an option will be allowed between part of the Science of the Upper School and one of the other Arts Matriculation languages.

Commercial Diplomas.

No departmental examination will be held hereafter for Commercial Diplomas. Boards of School Trustees may, however, grant diplomas on the courses of study heretofore prescribed for Parts I. and II. of the Departmental Commerical Diploma, or on such modifications thereof as may be approved by the Minister of Education.

District Certificates.

(Regulations 44, 63 and 64.)

(1) When in the opinion of the County Board of Examiners or of a District Public School Inspector, the standard of the Junior Leaving examination is too high for the condition of the County or District or any portion thereof, the Minister of Education may authorize the issue of District Certificates but the examinations therefor shall be held only in such counties or districts, and the professional certificate based thereon shall be valid only for such schools as each County Board or District School Inspector may designate.

(2) Candidates for District Certificates shall pass an examination in the following subjects as now defined in the courses of study for Forms I. and II. of the High Schools: English Grammar, English Literature, English Composition, Arithmetic and Mensuration, Algebra, Geometry, History, Geography, and Spelling: but any certificate obtained on the above examination will give the non-professional standing required for a District Certificate only when endorsed by a Public School Inspector or a High School Principal with a statement to the effect that the holder thereof has completed satisfactorily the courses of study in Reading, Drawing, Book-keeping, and Botany or Agriculture prescribed for Form I. of the High Schools.

(3) The standard for this examination shall be 34 per cent. of the marks assigned to each paper and 50 per cent. of the aggregate marks.

(4) The literature selections for the examination in 1904 shall be as follows:

Longfellow: Evangeline, The Day is Done, The Old Clock on the Stairs, The Fire of Driftwood, Resignation, The Warden of Cinque Ports, The Bridge, A Gleam of Sunshine.

TEXT-BOOKS AUTHORIZED FOR USE IN PUBLIC SCHOOLS, HIGH SCHOOLS AND TRAINING SCHOOLS.

Regulations.

(Approved August, 1903.)

1. The text-books named in Schedule "A" shall be the authorized text-books for Public Schools. Pupils taking any optional subject in the Public School course may use the text-book authorized in such optional subject. The text-books in French and German are authorized only for schools where the French or German language prevails and where the Trustees, with the approval of the Inspector, require French or German to be taught in addition to English. Text-books marked "optional" shall be introduced into the Public Schools only by resolution of the Board of Trustees. Books

authorized in Forms I. and II. of the High School course may be used by pupils taking the corresponding subjects of Continuation Classes.

2. The text-books named in Schedule "B" shall be the only authorized text-books in High Schools and Collegiate Institutes for the course of study prescribed in Forms I., II. and III. Books authorized for use in the Public Schools may be used in Forms I. and II.

3. The text-books named in Schedule "C" shall be the authorized text-books for Model Schools, Normal Schools and the Ontario Normal College. Only such books shall be used by the teachers-in-training as may be ordered by the Principal.

4. Any text-books used in any school on the 1st July, 1903, and recommended by resolution of the Trustees to be continued in use, shall be deemed as authorized in such school until further notice. The vertical or slanting copy books heretofore authorized, and published by the Rose Publishing Company, may be used in any Public School.

5. For religious instruction, either the Sacred Scriptures, or the Scripture Readings adopted by the Education Department, shall be used as prescribed by the Regulations of the Education Department.

Public Schools. (Schedule A.)

First Reader, Part I., or A Modern Phonic Primer (Morang) or The Public School Phonic Reader Part I.	$0 10
First Reader, Part II., or Public School Phonic Primer, Part II.	0 15
Second Reader	0 20
Third Reader	0 30
Fourth Reader	0 40
High School Reader	0 50
Public School Arithmetic	0 25
Public School Algebra and Euclid	0 25
Public School Geography or Morang's Modern Geography	0 75
Our Home and its Surroundings (for Junior Classes)	0 40
Public School Grammar or	0 25
Morang's A Modern English Grammar	0 60
Public School History of England and Canada	0 30
History of the Dominion of Canada (Fifth Form)	0 50
Public School Drawing Course, each number	0 05
Public School Physiology and Temperance	0 25
Public School Copy Book	0 07
Practical Speller	0 25
Public School Bookkeeping	0 25
Public School Agriculture	0 30
Public School Domestic Science (optional)	0 50

French-English Readers.

First Reader, Part I.	0 10
First Reader, Part II.	0 15
Second Reader	0 25
Third Reader	0 35

German English Readers.

Ahn's First German Book	0 25
Ahn's Second German Book	0 45
Ahn's Third German Book	0 45
Ahn's Fourth German Book	0 50
Ahn's First German Reader	0 50

High Schools and Collegiate Institutes. (Schedule B.)

English.

High School Reader	0 50
High School English Grammar	0 75
High School English Composition	0 50
Elementary English Composition (Sykes)	0 40
High School Composition from Models	0 75

History and Geography.

High School Geography or	1 00
Morang's Modern Geography	0 75
High School History of England and Canada	0 65
High School History of Greece and Rome	0 75
Or Myer's Ancient History—Greece and Rome—Canadian Edition	0 75
History of the Dominion of Canada—Clement	0 50

Mathematics.

High School Arithmetic	0 60
High School Algebra	0 75
Elements of Algebra, McLellan	0 75
High School Euclid, J. S. McKay or A. C. McKay, (Books I., II., III., 50 cents)	0 75

Classics.

First Latin Book and Reader	1 00
Primary Latin Book and Reader	1 00
High School Beginner's Greek Book	1 50

Moderns.

High School French Grammar and Reader	1 00
High School German Grammar and Reader	1 00

Science.

High School Physical Science, Part I., 50 cents ; Part II	$0 75
High School Botany, Part II	0 60
High School Chemistry	0 50

Bookkeeping and Drawing.

High School Bookkeeping	0 60
High School Drawing Course, each number	0 10

Cadet Drill.

High School Cadet Drill (optional)	0 40

Training Schools. (Schedule C.)

County Model Schools.

School Management, Millar	1 00
Methods in Teaching, Edited by Tilley	1 50
Public School Physiology and Temperance	0 25
Psychology applied to Teaching, Baldwin	1 50
Hand Book of Method for Teaching Phonic Reading, MacCabe	0 50
Steps in the Phonic System, Cullin & Niven	0 50
Elementary Phonetics, Burt	0 35
Elementary Treatise on Arithmetic, Taylor	0 50
Mental Arithmetic, McLelland & Ames	0 30
Algebraical Exercises, Barnes	0 30
Introductory Geometry, McLean	0 50
A Guide to Nature Study (Crawford	0 90

Normal Schools.

Lectures on Teaching, Fitch	1 00
School Management, Millar	1 00
Educational Reformers, Quick	1 50
Applied Psychology, McLellan	1 00
First Year at School, Sinclair	0 50
High School Cadet Drill Manual	0 40
Hints on Teaching Arithmetic, McLean	0 50
Public School Domestic Science	0 50

Ontario Normal College.

Applied Psychology, McLellan	1 00
Education, Spencer	0 50
School Management, Millar	1 00
School Management, Landon	1 50
Educational Reformers, Quick	1 50
High School Cadet Drill Manual	0 40
Physical Culture, Houghton	0 50
Physical Education, MacLaren, Part II, sections II. and III.	2 00

Teacher's Reading Course for 1904. (Schedule D.)

Systematic Methodolgy, (A. T. Smith)	2 0
Principles of Class Teaching (Findlay)	1 00
Interest and Education (D Garmo)	1 00

PROVINCIAL EXAMINATION IN DRAWING, PAINTING, ETC.

I.—Regulations.

1. The Education Department shall conduct an examination in April of each year for pupils attending art schools and evening classes. With the consent of the Education Department, pupils attending other schools may write at the same examination. The local expenses of the examination shall be paid by the school or class concerned.

2. Each Presiding Officer shall be responsible for the safe keeping of the parcel containing the examination papers, and for keeping the same, unopened, until the time of the examination; he shall preside at and be responsible for the proper conduct of the examination. Places shall be allotted to the candidates sufficiently far apart that they cannot overlook each other. He shall allot to each candidate the number given him for each course on the list.

3. Punctually at the time of the commencement of the examination in each subject the Presiding Officer, in the presence of the candidates, shall break the seal of the parcel containing the examination papers. The papers of one subject only shall be opened at one time, commencing with number 1 on the time-table, and following consecutively, unless instructions are given to conduct two or more examinations at the same time.

4. The Presiding Officer may permit the teacher of the class to assist in setting up objects for model drawing, drawing from the "round," etc. But he must leave the room before the examination papers are opened. Should any teacher wish to be examined, the Presiding Officer will place him apart from the other candidates during the examination.

5. Should any candidate be detected in copying from another, or allowing another to copy from him, or in taking into the room any book, notes, or anything from which he might derive assistance in the examination, or in talking or whispering, it shall be the duty of the Presiding Officer, if he obtains clear evidence of the fact at the time of its occurrence, to cause such candidate at once to leave the room; neither shall such candidate be permitted to enter during the remaining part of the examination, and his name shall be struck off the list. If, however, the evidence be not clear at the time, or be obtained after the conclusion of the examination, the Presiding Officer shall report the case to the Minister of Education.

6. No candidate leaving the room after issue of the examination papers, in any subject, shall be permitted to return during the examination of the subject in hand. Candidates who have been admitted late must hand in their papers at the same time as the others.

7. Punctually at the expiration of the time allowed, the Presiding Officer shall direct the candidates to stop drawing or writing, and cause them to hand in their papers immediately; and shall check off each paper so as to be certain that the number on the paper agrees with the number of the candidate. In no case shall the Presiding Officer allow the teacher or any other person to examine the work of the students, neither shall he make any comments or remarks about the character of the work done.

8. The Presiding Officer shall secure in a sealed parcel or envelope the work of the candidates and all unused papers and drawings, and at the close of the examination and on the same day, shall forward the same by post or express, prepaid, to the Education Department.

II.—Directions for Presiding Officer.

1. When distributing the papers, allot to each candidate the number given him for each course on the accompanying lists; as the candidates' names and numbers are entered in the Department Registers: no names on the list must be erased nor others substituted for them. If extra candidates present themselves for examination enter their names on the lists and allot them the last number on the list, with a letter of the alphabet added, thus, 486, 486a, 486b, etc.

2. When collecting the papers, check the numbers on the papers and see that they correspond with each candidate's number on the lists. All copies, drawings and papers must be returned to the Department of Education.

Primary Art Course.

1. Freehand Drawing from Flat Examples.—An example to be copied is sent for each candidate. Notify the candidates that ruling, tracing or measuring, or other mechanical means of execution, are strictly forbidden in working this exercise. It must be pure outline; no shading allowed.

2. Practical Geometry.—Instruments must be used and all construction lines allowed to remain.

3. Linear Perspective.—Instruments must be used and all working lines allowed to remain.

4. Model Drawing.—Provide a sufficient number of the objects selected by the Department, and place them in such a position that all the candidates may have a full view of them. No measuring or use of instruments is allowed; but the pencil may be held between the eye and the object for the purpose of estimating its apparent size. This exercise must be pure outline, no shading allowed; the purpose being to combine correctness of drawing and neatness of execution.

5. Memory or Blackboard Drawing.—No instruments or measuring allowed. Either crayon or pencil may be used.

Advanced Art Course.

1. Shading from Flat Examples. Sufficient copies are sent for groups of two students to one drawing. No ruling or measuring allowed. No restrictions as to style of shading—either point or stump may be used.

2. Outline Drawing from the "round."—This drawing must be life size, from an antique or modern bust. No ruling or measuring allowed. If there be any shading the exercise will not be examined.

3. Shading from the "round."—Provide a sufficient number of the objects selected by the Department; when possible they should be placed in the center of the room; if at night underneath the light, and students arranged at a uniform distance around them. No restrictions as to style of shading.

4. Drawing from Flowers, etc.—Select plants in bloom, such as Chinese Primroses or small Geraniums, having a sufficient number of examples so that there be not more than three or four candidates copying the same plant. This must be strict outline; no shading allowed. Distance, 6 to 8 feet.

5. Industrial Design.—Instruments to be used—units of design may be repeated mechanically by means of tracing paper. Drawings of flowers or ornaments are supplied on which to base designs—not as copies. The designs may be in pencil, ink, or tinted, at the option of the student.

Mechanical Drawing Course.

1. Projection and Descriptive Geometry.—Instruments to be used.
2. Machine Drawing.—Instruments to be used.
3. Building Construction.—Instruments to be used.
4. Architectural Design.—Sessional work only is required.
5. Advanced Perspective.—Instruments to be used.

Industrial Art Course.

1. Modelling in Clay.—Send specimens of work done during the session certified by the teacher.
2. Wood-carving.—Send specimens of work done during the current academic year certified by the teacher.
3. Wood-engraving.—Send specimens of work done during the current academic year certified by the teacher.
4. Lithography.—Send specimens of work done during the current academic year certified by the teacher.
5. China Painting.—Send specimens of work certified by the teacher.

Extra Subjects.

Specimens of paintings, wood carving, etc., sent for examination for certificates must be numbered and sent to the Department prepaid.

Toronto, February, 1903.

PROVISIONAL REGULATIONS, 1903.

(Approved March, 1903.)

MANUAL TRAINING, HOUSEHOLD SCIENCE, AND SPECIAL TECHNICAL INSTRUCTION.

1. The plans of every building hereafter erected or of any room adapted for the purpose of Manual Training, Household Science, or Special Technical Instruction shall be submitted to the Minister of Education, and be subject to his approval, and a copy of such plans shall be filed in the Department of Education.

2. Subject to the provisions of sections 5, 7 and 8 hereof, every school maintaining a Manual Training department shall be entitled to the following annual grants:—

(a) A fixed grant of $350.00.

(b) 10 per cent. of the expenditure over $600.00 for teacher's salary or salaries, but so as not in any case to exceed $100.00.

(c) 20 per cent. of the cost of equipment for each of the first five years, and thereafter of the annual renewals and additions.

3. Subject to the provisions of section 5, 7 and 8 hereof, every school maintaining a department for Household Science shall receive annually:—

(a) A fixed grant of $200.00.

(b) 20 per cent. of the expenditure over $500.00 for teachers' salaries, but so as not to exceed $50.00.

(c) 20 per cent. of the cost of equipment for each of the first five years, and thereafter of annual additions and renewals.

4. Any school under the control of a Public, Separate, or High School Board, or Board of Education, or of a recognized Technical School Board, which is specially organized and equipped for giving instruction in the theory and practice of the mechanical and industrial arts and sciences, shall be entitled, to receive out of any Legislative appropriation therefor, in addition to such sums as they may be entitled to receive under sections 2 and 3 hereof, such further sum as the Minister of Education may approve, based upon inspection and report, but so as not in any case to exceed $750.00. To be eligible for this grant the building in which instruction is given, equipment, courses of study, and qualification of staff shall be approved by the Minister of Education.

5. In apportioning the Legislative grants on equipments, the maximum value recognized shall be (a) for Manual Training $500.00, (b) for Household Science $300.00, but no grant in respect of equipment shall be paid where such equipment has been donated to the School Board.

6. The course of study, and the qualifications of every teacher hereafter employed, shall be subject to the approval and regulations of the Education Department.

7. The unit of distribution of the Legislative grant for Manual Training and Household Science shall be the time of one teacher for five hours on each of five days per week.

8. The grants mentioned in the foregoing sections shall be subject to such pro-rata increase or reduction as the Legislative appropriation therefor will permit.

9. No Manual Training or Household Science school or department will be recognized as efficiently equipped that is provided with accommodation for less than 12 or more than 25 students, at any one time, for practical work.

REGULATIONS RE PRIVATE SCHOOLS.

(Approved August, 1903.)

Under the provisions of the amended Assessment Act, passed by the Ontario Legislature in 1903, Private Schools and Colleges shall be exempt from municipal taxation by complying with the following regulations:

1. A copy of the Calendar or Prospectus of the institution shall be furnished the Education Department, giving all necessary information regarding the building and equipment, courses of study, staff of teachers or professors, etc. The teachers must hold legal certificates of qualifications or equivalent University attainments.

2. The approximate value of the property for which exemption is claimed shall be duly certified to by the authorities concerned. Exemption cannot be claimed for any property not in bona fide use for school purposes.

Incorporated institutions giving instruction to pupils in training solely for philanthropic and benevolent work, without expectation of gain or financial benefit to the members of the Corporation, shall be exempt.

3. The attendance of pupils of school age pursuing the obligatory subjects prescribed for Public, or Separate or High Schools must not be less than twenty-five, and a certificate must be furnished from some duly qualified physician showing that the class rooms and dormitories are sanitary in all regards.

4. Business Corporations under the designation of schools or colleges formed primarily for purposes of gain whose students are mainly adults taking special limited courses only, shall be liable for assessment as ordinarily heretofore.

5. A statement of the annual receipts and expenditure and such other information as the Minister of Education may require, shall be furnished to the Education Department on or before the first day of February of each year.

6. These regulations are provisional and valid only for the present year.

NORMAL SCHOOLS.

Memorandum from the Education Department.

As already announced, the change in the length of the session of the Provincial Normal Schools will take effect in September, 1903. Hereafter the session will extend from the second Tuesday in September in each year to the third Friday in June of the year following, and will consist of two terms. The first term will begin on the second Tuesday in September and end on the eighteenth day of December of the same year. The second term of the session will begin on the seventh day of January of the following year and end on the third Friday in June next following.

Any teacher who has at least Junior Leaving standing and who has taught a Public School successfully for one year, or who, after passing the County Model School examination has taught for six months under the supervision of the Inspector of a city having a City Model School, or any person qualified for admission to the Ontario Normal College, may be admitted as a Normal School student, but every applicant for admission shall be required to produce a medical certificate of freedom from serious pulmonary affections and from seriously defective eyesight and hearing, and also a certificate of good moral character. These are to be presented to the Principal of the Normal School on the entrance day.

Application for admission is to be made to the Deputy Minister on or before the first day of September preceding the session to which admission is desired. The fee for the session is ten dollars ($10.00), and is to be paid when application for admission is made. (If five dollars ($5.00) had already been paid the further sum of five dollars ($5.00) should be immediately sent.)

A calendar outlining the course of study and the requirements for graduation will be issued at an early date.

August 1, 1903.

SCHOOL GARDENS.

Regulations.

(Approved November, 1903.)

(1) For the purpose of encouraging agriculture and horticulture and also for the purpose of increasing the attractiveness of rural schools, the Minister of Education may issue instructions for the guidance of trustees, teachers and inspectors.

(2) Any rural School Board which provides a school garden with the necessary equipment and accommodation shall be entitled to a share of whatever money may be appropriated for the purpose by the Legislature.

(3) Every rural School Board which provides a school garden shall be entitled to an initial grant not exceeding one hundred dollars, and a subsequent annual grant of ten dollars, provided the appropriation made by the Legislature will warrant such payment.

(4) Should the appropriation made by the Legislature not be sufficient in any year to meet the demands arising from the establishment of school gardens, whatever sum is granted for the purpose by the Legislature will be paid pro rata.

(5) The area of the school garden must be at least one acre, in addition to that of the regular school grounds, to which it must be adjacent, or from which it must be removed only a short distance.

(6) The trustees must provide necessary tools and implements, such as rakes, hoes, lines, pruning knives, etc.

(7) A suitable shed must be erected for use as a working laboratory and for storage of tools, seeds, etc.

(8) Such instructions will be given by the Public School Inspector to the trustees and teacher as will meet the special character of the locality, and promote, so far as possible, a practical education.

(9) The grant will be payable on the report of the Inspector, who will certify that the School Board has complied with the prescribed conditions.

CIRCULAR TO INSPECTORS.

Gentlemen,—Your continued interest in the due observance of Arbor Day and Empire Day in every school in your inspectorate is earnestly invited. This year the former falls on Friday, May 1st, and the latter on Friday, May 22nd.

Your past efforts have been fruitful of much good and I believe are much appreciated, but there are still many barren, unlovely school grounds to be made beautiful, and fresh young minds and hearts to be filled with an appreciation of and love for British institutions. Let Arbor Day be a bright, joyous holiday devoted to the pleasure of making beautiful what should be beautiful, and developing in the young minds a keen appreciation of nature. Let Empire Day be also a day which will foster a healthy national patriotism and awaken all the pleasurable emotions which the love of our country and empire should inspire.

The experience of past years will guide teachers and trustees in the arrangement of their programmes which will vary according to circumstances. The following suggestions may, however, be found helpful. On both days the Canadian Ensign should be raised.

Arbor Day:

Preparation for Arbor Day should be begun two or three weeks beforehand. The work to be done should be carefully planned. In the laying out of paths or flower beds or in the location of trees, the trustees should be consulted. The kinds of trees to be planted, where they are to be obtained and all other preparations should be completed before the celebration of the

day. Let there be variety in the kinds of trees selected. A collection of our native trees and shrubs growing in any school ground may be made to serve a useful educational purpose.

The Forenoon.

The forenoon may be devoted to planting trees, making flower beds, clearing up the school grounds and sodding worn places. Let each class plant a tree, to be called "the class tree," and arrange its flower bed which it will care for.

The Afternoon.

A musical and literary programme may be arranged for the afternoon. Such songs and poems as the following are suggested:—"The Maple Leaf Forever," "All Hail the Broad-leaved Maple," "Selections from Hiawatha," "The Ivy Green" (Dickens), "Woodman Spare That Tree" (Morris), "A Glorious Tree is the Old Gray Oak" (Hill), "Forget Me Not" (Phoebe Cary), "The National Anthem."

Talks on the destruction of forests, and the economic uses of forests will be appropriate.

Empire Day.

As in previous year the forenoon exercise may be devoted to a study of the extent and resources of the British Empire, the relationships of the various outlying portions to the central authority, the different races owning the sway of the British Sovereign. Stirring incidents in the history of the Empire; great statesmen, soldiers, sailors and authors should all receive prominent attention.

An excellent programme for the afternoon may easily be prepared. Each teacher should try to enlist the co-operation of one or more of the trustees, the local clergymen, and all who can aid either by speech or song. Suitable recitations, readings and songs should be prepared by the pupils. The public should be invited. A few suitable selections for readings or recitations are given, but many others equally good may be chosen:—"Herve Riel" (Browning), "The Englishman" (Eliza Cook), "The Better Way" (S. Coolidge), "The Homes of England" (Hemans), "The Future of Canada" (Dufferin), "Sir Isaac Brock to his Soldiers" (Mair), "The Maple Leaf Forever," "Rule Britannia," "The Charge of the Light Brigade," "The National Anthem."

Toronto, March 24th, 1903.

SUMMER SCHOOL FOR TEACHERS.

The Education Department has made arrangements for a Summer School, to be held in London, Ont., at the beginning of the summer vacation. The purpose of the School is to give instruction in the following departments:— Manual Training, Household Science, Nature Study, Drawing.

Classes will be organized so as to enable students to take not more than two of these four departments. The course in Drawing will have special relation to the courses in Nature Study and Manual Training. Students may take classes in this subject along with any other two courses. Lectures will

be given by specialists in the respective subjects. Any further information required will be obtained by students after the classes are organized. No fees will be required, and it may be presumed that the cost of books, etc., will be slight. The School will be organized at the Normal School, London, at 2 p. m., Thursday, July 2nd, when all necessary information will be given. The session will continue for three weeks. Certificates of attendance will be awarded to those students who show satisfactory proficiency.

Teachers who desire to avail themselves of the privileges offered, should make application at an early date to Mr. J. Dearness, Vice-Principal, Normal School, London, Ont. No special form of application will be needed. The number admitted will be limited to 100 and applications will be accepted in the order in which they are received.

Toronto, April, 1903.

EXAMINATIONS 1904.

PRESCRIBED TEXTS.

Part II.—Junior Leaving.

English:—Tennyson, Lady of Shalott, Lotus Eaters, Oenone, The Epic and Morte d'Arthur, Ulysses "You ask me why," "Of old sat Freedom," "Love thou thy land," "St. Agnes' Eve," "Break, break, break," Sir Galahad, "Tears, idle tears," and the six interlude songs from The Princess, The Brook, Ode on the Duke of Wellington, Charge of the Light Brigade.

Shakespeare: Julius Caesar.

Latin: Cornelius Nepos, Lives of Themistocles, Aristides and Hannibal; Caesar, Bellum Gallicum, Bk. IV. (omitting Chap. 17), and Bk. V., Chaps. 1-23; Vergil, AEneid, Bk. II. (1-505).

Greek: Selections from Xenophon, Anabasis I., in White's Beginner's Greek Book (pp. 304-428), with the Exercises thereon: Homer, Iliad I.

French: Lamennais, Palores d'un croyant, Chaps. VII. and XVII.; Perrault, le Maitre Chat ou le Chat Botté. Dumas, Un nez gelé, and la Pipe de Jean Bart; Alphonse Daudet, la Derniere, Classe, and la Chévre de M. Seguin; Legouv la Patte de dindon; Pouvillon, Hortibus; Loti, Chagrin d'un vieux forcat; Molière, l'Avare, Acte III., sc. 5 (Est-ce à votre cocher..... sous la meinne); Victor Hugo, Waterloo, Chap. IX., Rouget de L'Isle, la Marseillaise; Arnault, la Feuille; Chateaubriand, l'Exilé; Theophile Gautier, la Chimère; Victor Hugo, Extase; Lamartine, l'Automne; De Musset, Tristesse; Sully Prudhomme, le Vase brisé; Le Fontaine, le Chêne et le Roseau.

Daudet, la Belle Nivernaise.

German: Grimm, Rotkappchen; Andersen, Wie's der Alté macht, Das neue Kleid, Venedig, Rothschild, Der Bär; Ertl, Himmelsschlüssel; Frommel, Das eiserne Kreuz; Baumbach, Nicotiana, Der Goldbaum; Heine, Lorelei Du bist wie eine Blume; Uhland, Schafer's Sonntagslied, Das Schloss am Meer; Chamisso, Das Schloss Boncourt; Claudius, Die Sterne, Der Riese Goliah; Goethe, Mignon, Erlkönig, Der Sänger; Schiller, Der Jüngling am Bache.

Baumbach, Waldnovellen.

Senior Leaving.

English: Tennyson, Lady of Shalott, Lotus Eaters, Oenone, The Epic and Morte d'Arthur, Ulysses, "You ask me why," "Of old sat Freedom," "Love thou thy land," "St. Agnes' Eve," "Break, break, break," Sir Galahad, "Tears, idle tears," and the six interlude songs from The Princess, The Brook, Ode on the Duke of Wellington, Charge of the Light Brigade.

Shakespeare: Macbeth, Julius Caesar.

Latin: Cornelius Nepos, Lives of Themistocles, Aristides and Hannibal; Caesar, Bellum Gallicum, Book IV., omitting Chap. 17, and Bk. V., Chaps. 1-23; Vergil AEneid II., lines 1-505; Horace, Odes III. and IV.; Cicero In Catilinam I., III., IV.

Greek: Xenophon, Anabasis I. (Chaps. I.-VIII.); Homer, Iliad I., Odyssey XIX.; Lucian, Timon; Lysias, Pro Mantitheo and de Invalido.

French: Lamennais, Paroles d'un croyant, Chaps. VII. and XVII.; Perrault, le Maitre Chat ou le Chat Botté; Dumas, Un nez gelé, and la Pipe de Jean Bart; Alphonse Daudet, la Dernière classe, and la Chèvre de M. Seguin; Legouvé, la Patte de dindon; Pouvillon, Hortibus; Loti, Chagrin d'un vieux for at; Molière, l'Avare, Acte III., sc. 5 (Est ce à votre cocher .....sous la mienne); Victor Hugo, Waterloo, Chap. IX.; Rouget de L'Isle, la Marseillaise; Arnault, la Feuille; Chateaubriand, l'Exilé; The Thèophile Gautier, la Chimère; Victor Hugo, Extase; Lamartine l'Automne; De Musset, Tristesse; Sully Prudhomme, la Vase brisé; La Fontaine, le Chêne et le Roseau.

Daudet, la Belle Nivernaise.

Saintine, Picciola. Ed. by A. R. Ropes, University Press (Cambridge).

German: Grimm, Rotkäppchen; Andersen, Wie's der Alte macht; Das neue Kleid, Venedig, Rothschild, Der Bar; Ertl, Himmelsschlussel; Frommel, Des eiserne Kreuz; Baumbach, Nicotiana, Der Goldbaum; Heine, Lorelei, Du bist wie eine Blume; Uhland, Schäfer's Sonntagslied, Des Schloss am Meer; Chamisso, Das Schloss Boncourt; Claudius, Die Sterne, Der Riese Goliath; Goethe, Mignon, Erlkönig, Der Sanger; Schiller, Der Jüngling am Bache.

Baumbach, Waldnovellen.

Ebner-Eschenbach, die Freiherren von Gemperlein.

Wilhelmi, Einer muss heiraten.

Benedix, Eigensinn.

Toronto, September, 1903.

APPORTIONMENT OF THE LEGISLATIVE PUBLIC SCHOOL GRANT FOR 1903.

The apportionment of the Grant to the several municipalities is based upon the latest Returns of Population for the year 1902, and the division between the Public and Separate Schools on the average attendance of that year, as reported by the Inspectors, Public School Boards, and Separate School Trustees respectively.

While the Separate Schools will receive their portion of the Grant direct from the Department, that of the Public Schools will be paid, according to this Schedule, through the respective County, City, Town, and Village Treasurers.

Under the provisions of Section 5 of "An Act respecting the Education Department, 1901," the Education Department is empowered "to appropriate out of moneys voted by the Legislature for public and separate schools a sum not exceeding $5.00 for every school in which the Regulations of the Department as to equipment, ventilation, heating, lighting and the care of the premises generally have been complied with."

Each County Inspector is therefore authorized to deduct from the apportionment of each township such an amount as will provide the sum of $5.00 to be paid on his order to each Trustee Board that has complied with the requirements mentioned.

Toronto, May, 1903.

Public School Apportionment to Counties for 1903.

1. COUNTY OF BRANT.

Municipalities.	Apportionment.
Brantford	$616 00
Burford	500 00
Dumfries, South	290 00
Oakland	85 00
Onondaga	167 00
Total	$1,658 00

2. COUNTY OF BRUCE.

Albemarle	$175 00
Amabel	337 00
Arran	290 00
Brant	483 00
Bruce	350 00
Carrick	295 00
Culross	228 00
Eastnor	186 00
Elderslie	260 00
Greenock	258 00
Huron	391 00
Kincardine	$330 00
Kinloss	269 00
Lindsay and St. Edmunds	95 00
Saugeen	179 00
Total	$4,126 00

3. COUNTY OF CARLETON.

Fitzroy	$294 00
Gloucester	535 00
Goulbourn	303 00
Gower, North	248 00
Huntley	260 00
March	81 00
Marlborough	183 00
Nepean	459 00
Osgoode	498 00
Torbolton	112 00
Total	$2,973 00

4. COUNTY OF DUFFERIN.

Amaranth	$326 00
Garafraxa, East	226 00
Luther, East	239 00
Melancthon	442 00
Mono	408 00
Mulmur	328 00
Total	$1,969 00

5. COUNTY OF ELGIN.

Municipalities.	Apportionment.
Aldborough	$560 00
Bayham	434 00
Dorchester, South	155 00
Dunwich	385 00
Malahide	434 00
Southwold	463 00
Yarmouth	585 00
Total	$3,016 00

6. COUNTY OF ESSEX.

Anderdon	$336 00
Colchester, North	226 00
Colchester, South	336 00
Gosfield, North	243 00
Gosfield, South	276 00
Maidstone	293 00
Malden	107 00
Mersea	508 00
Pelee Island	76 00
Rochester	101 00
Sandwich, East	92 00
Sandwich, West	238 00
Sandwich, South	151 00
Tilbury, North	44 00
Tilbury, West	271 00
Total	$3,196 00

7. COUNTY OF FRONTENAC.

Barrie	$ 64 00
Bedford	168 00
Clarendon and Miller	99 00
Hinchinbrooke	151 00
Howe Island	64 00
Kennebec	139 00
Kingston	306 00
Loughborough	176 00
Olden	129 00
Oso	130 00
Palmerston and N. and S. Canonto	103 00
Pittsburg	265 00
Portland	257 00
Storrington	206 00
Wolfe Island	112 00
Total	$2,296 00

8. COUNTY OF GREY.

Artemesia	$436 00
Bentinck	391 00
Collingwood	375 00
Derby	218 00
Egremont	376 00
Euphrasia	356 00
Glenelg	286 00
Holland	366 00
Keppel	377 00
Normanby	506 00
Osprey	583 00
Proton	342 00
Sarawak	153 00
St. Vincent	340 00
Sullivan	412 00
Sydenham	403 00
Total	$5,720 00

9. COUNTY OF HALDIMAND.

Canborough	$102 00
Cayuga, North	182 00
Cayuga, South	92 00
Dunn	101 00
Moulton	219 00
Oneida	167 00
Rainham	209 00
Sherbrooke	46 00
Walpole	498 00
Total	$1,824 00

10. COUNTY OF HALIBURTON.

Anson and Hindon	$ 32 00
Cardiff	72 00
Dudley, Dysart, Harcourt, Harburn, Guilford	121 00
Glamorgan	63 00
Livingstone	5 00
Lutterworth	55 00
McClintock	6 00
Minden	149 00
Monmouth	63 00
Nightingale	1 00
Sherbourne	17 00
Snowdon	97 00
Stanhope	53 00
Total	$734 00

11. COUNTY OF HALTON.

Esquesing	$410 00
Nassagaweya	276 00
Nelson	322 00
Trafalgar	415 00
Total	$1,423 00

12. COUNTY OF HASTINGS.

Carlow	$ 81 00
Dungannon	98 00
Elzevir and Grimsthorpe	152 00
Faraday	132 00
Hungerford	438 00
Huntingdon	257 00
McClure, Wicklow and Bangor	96 00
Herschel and Monteagle	245 00
Madoc	403 00
Marmora and Lake	185 00
Mayo	63 00
Rawdon	358 00

COUNTY OF HASTINGS.—Con.

Sidney	$426 00
Thurlow	479 00
Tudor and Cashel	107 00
Limerick	65 00
Wollaston	85 00
Tyendinaga	330 00
Total	$4,000 00

13. COUNTY OF HURON.

Ashfield	$333 00
Colborne	212 00
Goderich	294 00
Grey	397 00
Hay	369 00
Howick	464 00
Hullett	313 00
McKillop	271 00
Morris	293 00
Stanley	256 00
Stephen	449 00
Tuckersmith	287 00
Turnberry	250 00
Usborne	275 00
Wawanosh, East	229 00
Wawanosh, West	216 00
Total	$4,908 00

14. COUNTY OF KENT.

Camden	$297 00
Chatham	614 00
Dover	375 00
Harwich	551 00
Howard	410 00
Orford	320 00
Raleigh	488 00
Romney	219 00
Tilbury, East	435 00
Zone	150 00
Total	$3,859 00

15. COUNTY OF LAMBTON.

Bosanquet	$312 00
Brooke	414 00
Dawn	412 00
Enniskillen	571 00
Euphemia	262 00
Moore	531 00
Plympton	412 00
Sarnia	252 00
Sombra	446 00
Warwick	378 00
Total	$3,990 00

16. COUNTY OF LANARK.

Bathurst	$290 00
Beckwith	191 00
Burgess, North	51 00
Dalhousie and Sherbrooke, North	225 00
Darling	90 00
Drummond	235 00
Elmsley, North	121 00
Lanark	201 00
Lavant	63 00
Montague	228 00
Packenham	183 00
Ramsay	262 00
Sherbrooke, South	101 00
Total	$2,241 00

17. COUNTY OF LEEDS.

Bastard and Burgess, South	$320 00
Crosby, North	135 00
Crosby, South	194 00
Elizabethtown	476 00
Elmsley, South	90 00
Kitley	219 00
Leeds and Lansdowne, Front	326 00
Leeds and Lansdowne, Rear	264 00
Yonge and Escott, Rear	136 00
Yonge, Front and Escott	298 00
Total	$2,458 00

17 (a) COUNTY OF GRENVILLE.

Augusta	$436 00
Edwardsburg	426 00
Gower, South	91 00
Oxford, Rideau	307 00
Wolford	208 00
Total	$1,468 00

18. COUNTY OF LENNOX AND ADDINGTON.

Adolphustown	$ 65 00
Amherst Island	97 00
Anglesea, Effingham and Kaladar	157 00
Camden, East	645 00
Denbigh, Abinger and Ashley	129 00
Ernesttown	358 00
Fredericksburg, North	181 00
Fredericksburg, South	111 00
Richmond	271 00
Sheffield	216 00
Total	$2,230 00

19. COUNTY OF LINCOLN.

Caistor	$200 00
Clinton	231 00
Gainsborough	257 00
Grantham	229 00
Grimsby, North	144 00
Grimsby, South	157 00
Louth	206 00
Niagara	215 00
Total	$1,639 00

20. COUNTY OF MIDDLESEX.

Adelaide	$240 00
Biddulph	195 00
Caradoc	477 00
Delaware	179 00
Dorchester, North	412 00
Ekfrid	322 00
Lobo	313 00
London	950 00
McGillivray	341 00
Metcalfe	183 00
Mosa	297 00
Nissouri, West	300 00
Westminster	545 00
Williams, East	168 00
Williams, West	204 00
Total	$5,126 00

21. COUNTY OF NORFOLK.

Charlotteville	$382 00
Houghton	232 00
Middleton	299 00
Townsend	479 00
Walsingham, North	252 00
Walsingham, South	225 00
Windham	293 00
Woodhouse	247 00
Total	$2,509 00

22. COUNTY OF NORTHUMBERLAND.

Alnwick	$123 00
Brighton	284 00
Cramahe	280 00
Haldimand	422 00
Hamilton	453 00
Monaghan, South	110 00
Murray	514 00
Percy	326 00
Seymour	345 00
Total	$2,657 00

22. (a) COUNTY OF DURHAM.

Cartwright	$210 00
Cavan	302 00
Clarke	418 00
Darlington	464 00
Hope	377 00
Manvers	317 00
Total	$2,088 00

23. COUNTY OF ONTARIO.

Brock	$431 00
Mara	299 00
Pickering	636 00
Rama	752 00
Reach	405 00
Scott	263 00
Scugog Island	59 00
Thorah	171 00
Uxbridge	324 00
Whitby, East	315 00
Whitby	227 00
Total	$3,282 00

24. COUNTY OF OXFORD.

Blandford	$296 00
Blenheim	509 00
Dereham	428 00
Nissouri, East	313 00
Norwich, North	273 00
Norwich, South	287 00
Oxford, North	153 00
Oxford, East	305 00
Oxford, West	246 00
Zorra, East	502 00
Zorra, West	306 00
Total	$3,518 00

25. COUNTY OF PEEL.

Albion	$257 00
Caledon	460 00
Chinguacousy	455 00
Gore of Toronto	106 00
Toronto	602 00
Total	$1,880 00

26. COUNTY OF PERTH.

Blanchard	$305 00
Downie	295 00
Easthope, North	246 00
Easthope, South	231 00
Ellice	322 00
Elma	451 00
Fullarton	263 00
Hibbert	194 00
Logan	366 00
Mornington	339 00
Wallace	330 00
Total	$3,342 00

27. COUNTY OF PETERBOROUGH.

Anstruther	$ 35 00
Asphodel	196 00
Belmont	223 00
Burleigh	46 00
Cavendish	17 00
Chandos	96 00
Douro	258 00
Dummer	219 00
Ennismore	99 00
Galway	112 00
Harvey	116 00
Methuen	27 00
Monaghan, North	108 00
Otonabee	396 00
Smith	324 00
Total	$2,272 00

28. COUNTY OF PRESCOTT.

Alfred	$ 33 00
Caledonia	108 00
Hawkesbury, East	285 00
Hawkesbury, West	323 00
Longueuil	56 00
Plantagenet, North	356 00
Plantagenet, South	212 00
Total	$1,373 00

28 (a) COUNTY OF RUSSELL.

Cambridge	$158 00
Clarence	145 00
Cumberland	308 00
Russell	143 00
Total	$754 00

29. COUNTY OF PRINCE EDWARD.

Ameliasburg	$356 00
Athol	131 00
Hallowell	374 00
Hillier	173 00
Marysburg, North	155 00
Marysburg, South	146 00
Sophiasburg	222 00
Total	$1,557 00

30. COUNTY OF RENFREW.

Admaston	$258 00
Algona, South	115 00
Alice and Fraser	252 00

COUNTY OF RENFREW.—Con.

Bagot and Blithfield	183 00
Brougham	55 00
Bromley	157 00
Brudenell and Lynedoch	163 00
Grattan	239 00
Griffith and Matawatchan	56 00
Hagarty, Jones, Sherwood, Richards and Burns	207 00
Head, Clara and Maria	54 00
Horton	166 00
McNab	421 00
Pembroke	69 00
Petewawa	120 00
Radcliffe	40 00
Raglan	87 00
Rolph, Wylie, McKay, Buchanan	123 00
Ross	247 00
Sebastopol	85 00
Stafford	109 00
Westmeath	418 00
Wilberforce and Algona, North	294 00
Total	$3,918 00

31. COUNTY OF SIMCOE.

Adjala	$223 00
Essa	508 00
Flos	418 00
Gwillimbury, West	268 00
Innisfil	442 00
Matchedash	58 00
Medonte	483 00
Nottawasaga	614 00
Orillia	431 00
Oro	475 00
Sunnidale	248 00
Tay	586 00
Tiny	384 00
Tecumseh	340 00
Tossorontio	189 00
Vespra	337 00
Total	$6,004 00

32. COUNTY OF STORMONT.

Cornwall	$500 00
Finch	349 00
Osnabruck	587 00
Roxborough	419 00
Total	$1,954 00

32 (a) COUNTY OF DUNDAS.

Matilda	$444 00
Mountain	338 00
Williamsburg	452 00
Winchester	385 00
Total	$1,619 00

32 (b) COUNTY OF GLENGARRY.

Charlottenburg	$535 00
Kenyon	507 00
Lancaster	408 00
Lochiel	424 00
Total	$1,874 00

33. COUNTY OF VICTORIA.

Bexley	$102 00
Carden	85 00
Dalton	63 00
Eldon	359 00
Emily	240 00
Fenelon	274 00
Laxton, Digby and Longford	90 00
Mariposa	428 00
Ops	267 00
Somerville	225 00
Verulam	228 00
Total	$2,352 00

34. COUNTY OF WATERLOO.

Dumfries, North	$244 00
Waterloo	800 00
Wellesley	461 00
Wilmot	549 00
Woolwich	489 00
Total	$2,543 00

35. COUNTY OF WELLAND.

Bertie	$[illegible]
Crowland	102 00
Humberstone	351 00
Pelham	286 00
Stamford	231 00
Thorold	243 00
Wainfleet	308 00
Willoughby	114 00
Total	$1,996 00

36. COUNTY OF WELLINGTON.

Arthur	$225 00
Eramosa	311 00
Erin	397 00
Garafraxa, West	269 00
Guelph	271 00
Luther, West	250 00
Maryborough	364 00

COUNTY OF WELLINGTON.—Con.

Minto	423 00
Nichol	186 00
Peel	438 00
Pilkington	165 00
Puslinch	351 00
Total	$3,708 00

37. COUNTY OF WENTWORTH.

Ancaster	$423 00
Barton	437 00
Beverly	465 00
Binbrook	156 00
Flamborough, East	287 00
Flamborough, West	363 00
Glanford	183 00
Saltfleet	333 00
Total	$[illegible]

COUNTY OF YORK.

Etobicoke	$445 00
Georgina	197 00
Gwillimbury, East	409 00
Gwillimbury, North	154 00
King	595 00
Markham	612 00
Scarborough	435 00
Vaughan	505 00
Whitchurch	387 00
York	1,247 00
Total	$4,986 00

39. DISTRICTS.

Algoma, Muskoka, Nipissing, Parry Sound, Rainy River and Thunder Bay, including rural separate schools, but not schools in towns and villages named in this ilst	$40,000 00
Total	$40,000 00

APPORTIONMENT TO ROMAN CATHOLIC SEPARATE SCHOOLS FOR 1903, PAYABLE THROUGH THIS DEPARTMENT.

School Sections.	Apportionment.
Adjala 10	$28 00
Alfred 3	21 00
Alfred 6	25 00
Alfred 7 (with 8, Plantagenet, S.)	12 00
Alfred 7	33 00
Alfred 8	41 00
Alfred 9	24 00
Alfred 10	69 00
Alfred 11	21 00
Alfred 12	27 00
Alfred 13	27 00
Alfred 14	18 00
Alfred 15	25 00
Admaston 4	14 00
Anderdon, 2, 5 and 8 (with 9 and Sandwich W.)	38 00
Anderdon ..... 3 and 4	15 00
Arthur 6	30 00
Arthur 10	32 00
Ashfield 2	46 00
Asphodel 4	20 00
Augusta 15	14 00
Balfour, 4 (District of Algoma)	
Biddulph 3	13 00
Biddulph 4	33 00
Biddulph 6	25 00
Biddulph 9 (with 1 McGillivray	10 00
Bonfield, 1A, 1B, 2, 4 (District of Nipissing)	
Brant (with 3 Greenock) 2	9 00
Brighton 1 (15)	12 00
Bromley 4	23 00
Bromley 6	25 00
Bromley 7	58 00
Brougham 1	23 00
Burgess, North 2	21 00
Burgess, North 4	12 00
Burgess, North 5	14 00
Caledonia ..... 3, 4 and 10	12 00
Caledonia 6 (with 7 Plantagenet S.)	14 00
Caledonia 10	17 00
Caledonia 12	35 00
Caledonia 13	16 00
Cambridge 3	26 00
Cambridge 4	14 00
Cambridge 5	33 00
Cambridge 6	25 00
Cambridge ..... 6 and 7	21 00
Cambridge ..... 14 P	16 00
Carrick 1	30 00
Carrick (with 1 Culross) 1	66 00
Carrick 2	18 00
Carrick (with 2 Culross) 2	14 00
Carrick 4	28 00
Carrick 14	109 00
Charlottenburg 15	23 00
Charlottenburg 16	26 00
Chisholm and Boulter ..... 1 (Nipissing)	
Chisholm ..... 2 (Nipissing)	
Clarence ..... 3 (to be app'd)	
Clarence 5	79 00
Clarence 6	61 00
Clarence 8	39 00
Clarence 11	28 00
Clarence 12	19 00
Clarence 13	13 00
Clarence 14	$30 00
Clarence 16	27 00
Clarence 17	21 00
Clarence ..... 18 (to be ap'd)	
Clarence 19	19 00
Clarence 20	17 00
Clarence 21	27 00
Cornwall 1	19 00
Cornwall 16	70 00
Crosby, North 4	65 00
Crosby, North 7	7 00

School Sections.	Apportionment.
Culross (with 1 Carrick) 1	76 00
Culross (with 2 Carrick) 2	17 00
Cumberland 10	17 00
Cumberland 11	16 00
Cumberland 13	21 00
Cumberland 14	55 00
Dilke, 6 (Dist. Algoma)	
Downie 9	30 00
Dover 3	62 00
Dover 7	29 00
Dover 9	45 00
Dunnett and Rutter, 1 District of Nipissing	
Edwardsburg 2	5 00
Ellice ..... 1 (to be ap'd)	
Ellice 7	19 00
Ferris, 5 District of Nipissing)	
Ferris, 4 District of Nipissing	
Finch 5	51 00
Flamborough, West 2	11 00
Gibbons, 1 (Dist. of Nipissing)	
Greenock ..... 3 (with 2 Brant)	66 00
Glenelg 5	17 00
Glenelg 7	26 00
Gloucester ..... 1 (with 3 Osgoode)	9 00
Gloucester ..... 4, 5 and 12	8 00
Gloucester 14	33 00
Gloucester 15	67 00
Gloucester 17	18 00
Gloucester 20	20 00
Gloucester 22	8 00
Gloucester 25	81 00
Gloucester 26	26 00
Griffith, etc 3	11 00
Hagarty 4	42 00
Hagarty 12	48 00
Haldimand 2	24 00
Haldimand 14	17 00
Harwich 9	26 00
Hawkesbury, East 2	61 00
Hawkesbury, East 4	15 00
Hawkesbury, East 6	15 00
Hawkesbury, East 7	102 00
Hawkesbury, East 10	47 00
Hawkesbury, East 11	28 00
Hawkesbury, East 12	13 00
Hawkesbury, East 15	25 00
Hawkesbury East 16	9 00
Hay 1	54 00
Hibbert (1) 3	15 00
Hibbert 2 (with McKillop, etc)	33 00
Hibbert 3	4 00
Howe Island 1	11 00
Howe Island 2	16 00
Howe Island 3	16 00
Holland, etc 3	16 00
Hullett 2	$13 00
Keewatin, 1 (see Dist. Algoma)	
Kenyon 12	(to be ap'd)
Kingston 8	15 00
Lancaster 14	39 00
Lochiel 11	25 00
Lochiel 12A	53 00
Lochiel 12B	66 00
Longueuil, West 2	21 00
Longueuil, West 4A	26 00
Longueuil, West 7	20 00
Loughboro' 2	16 00
Loughboro' 10	23 00
Maidstone 1	43 00
Maidstone 2	(to be ap'd)
Maidstone 4 (with 2 Rochester)	15 00
Malden 3A	31 00
Malden 3B	24 00
Mara 3	65 00
March 3	35 00
Marmora and Lake 1	13 00

APPORTIONMENT TO ROMAN CATHOLIC SEPARATE SCHOOLS FOR 1903.—Concluded.

School Sections.	Apportionment.
Matawatchan 3	21 00
Moore ..... 3, 4 and 5	8 00
Mornington 4	30 00
McGillivray, 1 (with 9 Biddulph)	9 00
McKillop 1	21 00
McKillop 3 (with Hibbert)	13 00
McKillop (2 Hibbert, etc.)	9 00
Nepean 7	31 00
Nepean 15	78 00
Nichol 1	16 00
Normanby 5	19 00
Normanby 10	13 00
Osgoode 1	21 00
Osgoode 2 (15)	14 00
Osgoode, 3 (with 1 Gloucester)	9 00
Papineau, 1 (see Dist. Nipissing)	
Papineau, 2 (see Dist. Nipissing)	
Papineau, 2B (see Dist. Nipissing)	
Peel 8	16 00
Peel 12	15 00
Percy 5	11 00
Percy, 12 (with 12 Seymour)	5 00
Plantagenet, North 4	25 00
Plantagenet, North 7	22 00
Plantagenet, North 8	14 00
Plantagenet, North 9	29 00
Plantagenet, North 12	13 00
Plantagenet, South 4	44 00
Plantagenet, South 7	39 00
Plantagenet, South 7 (with 6 Caledonia)	13 00
Plantagenet, South 8	23 00
Plantagenet, South, 8 (with 7 Alfred)	10 00
Portland 11	7 00
Proton 6	17 00
Raleigh 4	13 00
Raleigh 5	26 00
Raleigh 6	20 00
Rayside, 1 (with 1 Balfour) Algoma	
Richmond ..... 10 and 17	14 00
Rochester, 2 (with 4 Maidstone)	26 00
Rochester 3	68 00
Rochester 6	51 00
Rochester 7	51 00
Rochester ..... 9 & 14 (to be app'd)	
Rochester, 10 (with 11 Tilbury, N)	$11 00
Roxboro' 12	66 00
Roxboro' 16	20 00
Russell, 1 (with 12 Winchester) ..	9 00
Russell 4	18 00
Russell 6	107 00
Russell 7	21 00
Russell 8	33 00
Russell 13	14 00
Sandwich East 1	115 00
Sandwich East 2	22 00
Sandwich East 3	21 00
Sandwich East 4	103 00
Sandwich West 1	36 00
Sandwich West ..... 4 (to be app'd)	
Sandwich West (with 2, 5, 8 Anderdon) ..... 6 and 9	31 00
Sandwich, South 5	29 00
Sandwich, South 7	14 00
Seymour, 12 (with 12 Percy)	6 00
Sheffield 5	33 00
Sherwood 6	63 00
Sombra 5	24 00
Stafford 2	21 00
Stephen 6	39 00
Springer, 1, 2, 3, (District of Nipissing)	
Stanley ..... 1 (to be app'd)	
Sunnidale ..... 6 (to be app'd)	
Sydenham 7	11 00
Tilbury, N 1	66 00
Tilbury, N 2	42 00
Tilbury, N 6	30 00
Tilbury, N 7	39 00
Tilbury, N. (with 10 Rochester) 11	31 00
Tilbury, West ..... 11 (to be app'd)	
Tiny 2	6 00
Toronto Gore 6	13 00
Tyendinaga 18	12 00
Tyendinaga 20	16 00
Tyendinaga 24	14 00
Tyendinaga 28	11 00
Tyendinaga 30	14 00
Vespra 7	3 00
Waterloo 13	71 00
Wawanosh, West 1	23 00
Wellesley 5	17 00
Wellesley ..... 9 and 10	26 00
Wellesley 11	76 00
Wellesley 12	4 00
Westminster 13	10 00
Widdifield, 2 (District of Nipissing	
Williams, West 10	29 00
Wilmot 15½	57 00
Winchester, 12 (with 1 Russell)	11 00
Windham 8	48 00
Wolfe Island 1	11 00
Wolfe Island 2	19 00
Wolfe Island 4	33 00
Wolfe Island 7	13 00
Woolwich 10	35 00
Yonge and Escott R 4	13 00
York 1	28 00
	$6,628 00

APPORTIONMENT TO CITIES, TOWNS AND VILLAGES FOR 1903.

CITIES.	Public Schools	Separate Schools	Total
	$ c.	$ c.	$ c.
Belleville	943 00	276 00	1,219 00
Brantford	1,746 00	232 00	1,978 00
Chatham	889 00	197 00	1,086 00
Guelph	1,150 00	230 00	1,380 00
Hamilton	5,530 00	1,089 00	6,619 00
Kingston	1,814 00	448 00	2,262 00
London	3,947 00	622 00	4,569 00
Ottawa	3,506 00	3,985 00	7,491 00
St. Catharines	1,023 00	274 00	1,297 00
St. Thomas	1,277 00	170 00	1,447 00
Stratford	1,080 00	236 00	1,316 00
Toronto	22,258 00	3,679 00	25,937 00
Windsor	1,205 00	344 00	1,549 00
Woodstock	1,077 00	69 00	1,146 00
Total	47,445 00	11,851 00	59,296 00
TOWNS.			
Alexandria	65 00	151 00	216 00
Alliston	158 00	.....	158 00
Almonte	283 00	97 00	380 00
Amherstburg	135 00	125 00	260 00
Arnprior	286 00	178 00	464 00
Aurora	195 00	.....	195 00
Aylmer	268 00	.....	268 00
Barrie	635 00	112 00	747 00
Berlin	956 00	290 00	1,246 00
Blenheim	205 00	.....	205 00
Bothwell	102 00	.....	102 00
Bowmanville	343 00	.....	343 00
Bracebridge	311 00	.....	311 00
Brampton	329 00	.....	329 00
Brockville	659 00	261 00	920 00
Carleton Place	504 00	.....	404 00
Clinton	287 00	.....	287 00
Cobourg	387 00	157 00	544 00
Collingwood	796 00	.....	796 50
Copper Cliff	273 00	.....	273 00
Cornwall	342 00	422 00	764 00
Deseronto	404 00	.....	404 00
Dresden	195 00	.....	195 00
Dundas	306 00	86 00	392 00
Dunnville	270 00	.....	270 00
Durham	195 00	.....	195 00
East Toronto	233 00	.....	233 00
Essex	172 00	.....	172 00
Forest	193 00	.....	193 00
Fort Frances	74 00	.....	74 00
Fort William	451 00	136 00	587 00
Galt	937 00	57 00	994 00
Gananoque	451 00	.....	451 00
Goderich	441 00	53 00	494 00
Gore Bay	110 00	.....	110 00
Gravenhurst	260 00	.....	260 00
Harriston	216 00	.....	216 00
Hawkesbury	33 00	227 00	260 00
Hespeler	300 00	.....	300 00
Huntsville	271 00	.....	271 00
Ingersoll	500 00	58 00	558 00
Kincardine	279 00	.....	279 00
Kingsville	203 00	.....	203 00
Leamington	324 00	.....	324 00
Lindsay	661 00	184 00	845 00
Listowel	326 00	.....	326 00
Little Current	98 00	.....	98 00
Mattawa	39 00	133 00	172 00
Meaford	232 00	.....	232 00
Midland	371 00	.....	371 00
Mitchell	231 00	.....	231 00
Milton	161 00	.....	161 00
Mount Forest	246 00	.....	246 00
Napanee	348 00	.....	348 00
New Liskeard	110 00	.....	110 00
Newmarket	256 00	36 00	292 00
Niagara	148 00	.....	148 00
Niagara Falls	486 00	104 00	590 00
North Bay	232 00	123 00	355 00
North Toronto	224 00	.....	224 00
Oakville	186 00	22 00	208 00
Orangeville	455 00	.....	455 00
Orillia	506 00	127 00	633 00
Oshawa	491 00	59 00	550 00
Owen Sound	1,077 00	76 00	1,153 00
Palmerston	222 00	.....	222 00
Parkhill	146 00	27 00	173 00

APPORTIONMENT TO CITIES, TOWNS AND VILLAGES FOR 1903.—*Continued*

TOWNS.—*Continued.*	Public Schools	Separate Schools	Total
	$ c.	$ c.	$ c.
Paris	283 00	45 00	328 00
Parry Sound	358 00		358 00
Pembroke	334 00	299 00	633 00
Penetanguishene	343 00		343 00
Perth	307 00	142 00	449 00
Peterborough	936 00	420 00	1,356 00
Petrolea	480 00		480 00
Picton	433 40	40 00	473 00
Port Arthur	296 00	107 00	403 00
Port Hope	503 00		503 00
Prescott	251 00	120 00	371 00
Preston	225 00	56 00	281 00
Rat Portage	418 60	109 40	527 00
Renfrew	235 00	166 00	401 00
Ridgetown	277 00		277 00
Sandwich	72 00	112 00	184 00
Sarnia	860 00	224 00	1,084 00
Sault Ste. Marie	871 00	180 05	1,051 00
Seaforth	206 00	56 00	262 00
Simcoe	557 00		557 00
Smith's Falls	648 00		648 00
Stayner	142 00		142 00
Sturgeon Falls	102 00	114 00	216 00
St. Mary's	373 00	45 00	418 00
Strathroy	358 00		358 00
Sudbury	79 00	108 00	187 00
Thessalon	141 00		141 00
Thornbury	93 00		93 00
Thorold	184 00	86 00	270 00
Tillsonburg	271 00		271 00
Toronto Junction	740 00		740 00
Trenton	505 00		505 00
Uxbridge	208 00		208 00
Vankleek Hill	133 00	149 00	282 00
Walkerton	250 00	121 00	371 00
Walkerville	195 00		195 00
Wallaceburg	304 00	77 00	381 00
Waterloo	375 00	72 00	447 06
Welland	240 00		240 00
Whitby	244 09	31 00	275 00
Wiarton	280 00		280 00
Wingham	259 00		259 00
Total	35,669 00	6,260 00	41,875 00
INCORPORATED VILLAGES.			
Acton	167 00		167 00
Ailsa Craig	86 00		86 00
Alvinston	98 00		98 00
Arkona	55 00		55 00
Arthur	85 00	62 00	147 00
Athens	108 00		108 00
Ayr	104 00		104 00
Ashburnham	223 00		223 00
Bath	47 00		47 00
Bayfield	70 00		70 00
Beamsville	103 00		103 00
Beaverton	86 00		86 00
Beeton	85 00		85 00
Belle River	9 00	60 00	69 00
Blyth	104 00		104 00
Bobcaygeon	108 00		108 00
Bolton	82 00		82 00
Bradford	121 00		121 00
Bridgeburg	62 00		62 00
Brighton	163 00		162 00
Brussels	146 00		146 00
Burk's Falls	91 00		91 00
Burlington	162 00		162 00
Caledonia	105 00		105 00
Campbellford	297 00		297 00
Cannington	143 00		143 00
Cardinal	163 00		163 00
Casselman	23 00	92 00	115 00
Cayuga	110 00		110 00
Chesley	213 00		213 00
Chesterville	106 00	Included in Village grant	106 00
Chippewa	56 00		56 00
Clifford	73 00		73 00
Colden	80 00		80 00
Colborne	121 00		121 00
Creemore	73 00		73 00
Delhi	95 00		95 00
Drayton	94 00		94 00

APPORTIONMENT TO CITIES, TOWNS AND VILLAGES FOR 1903.—*Continued.*

INCORPORATED VILLAGES.—*Continued.*	Public Schools	Separate Schools	Total
	$ c.	$ c.	$ c.
Dundalk	100 00		106 00
Dutton	106 00		106 00
Eganville	71 00	64 00	135 00
Elmira	134 00		134 00
Elora	123 00	19 00	142 00
Embro	71 00		71 00
Erin	59 00		59 00
Exeter	210 00		210 00
Fenelon Falls	135 00		135 00
Fergus	167 00	17 00	184 00
Fort Erie	100 00		100 00
Garden Island	31 00		31 00
Georgetown	169 00		169 00
Glencoe	119 00		119 00
Grand Valley	97 00		97 00
Grimsby	119 00		119 00
Hagersville	112 00		112 00
Hastings	61 00	34 00	95 00
Hanover (including $44 arrears of grant due)	218 00		218 00
Havelock	121 00		121 00
Hensall	97 00		97 00
Hintonburg	158 00	157 00	315 00
Holland Landing	53 00		53 00
Iroquois	128 00		128 00
Kemptville	177 00		177 00
Lakefield	139 00		139 00
Lanark	105 00		105 00
Lancaster	63 00		63 00
L'Orignal	113 00	34 00	147 00
Lucan	103 00		103 00
Lucknow	118 00		118 00
Madoc	148 00		148 00
Markdale	122 00		122 00
Markham	136 00		136 00
Marmora	85 00		85 00
Maxville	96 00		96 00
Merrickville	117 00		117 00
Merritton	153 00	47 00	200 00
Millbrook	110 00		110 00
Milverton	86 00		86 00
Morrisburg	191 00		191 00
Newboro'	48 00		48 00
Newburgh	69 00		69 00
Newbury	48 00		48 00
Newcastle	69 00		69 00
New Hamburg	144 00		144 00
Niagara Falls, South	163 00		163 00
Norwich	158 00		154 00
Norwood	103 00		103 00
Oil Springs	117 00		117 00
Omemee	76 00		76 00
Ottawa, East	82 00	91 00	173 00
Paisley	125 00		125 00
Point Edward	129 00		129 00
Portsmouth	43 00	28 00	71 00
Port Carling	34 00		34 00
Port Colborne	154 00		154 00
Port Dalhousie	106 00	44 00	150 00
Port Dover	134 00		134 00
Port Elgin	159 00		159 00
Port Perry	169 00		169 00
Port Rowan	89 00		89 00
Port Stanley	67 00		67 00
Richmond	54 00		54 00
Richmond Hill	73 00		73 00
Rockland	22 00	138 00	160 00
Shelburne	142 00		142 00
Southampton	206 00		206 00
Springfield	60 00		60 00
Stirling	103 00		103 00
Stouffville	142 00		142 00
Streetsville	58 00		58 00
Sundridge	49 00		49 00
Sutton	75 00		75 00
Tara	83 00		83 00
Teeswater	117 00		117 00
Thamesville	97 00		97 00
Thedford	74 00		74 00
Tilbury	66 00	66 00	132 00
Tiverton	55 00		55 00
Tottenham	55 00		55 00
Tweed	117 00	27 00	144 00
Vienna	41 00		41 00
Wardsville	38 00		38 00
Waterdown	77 00		77 00

APPORTIONMENT TO CITIES, TOWNS AND VILLAGES FOR 1903.—*Concluded.*

INCORPORATED VILLAGES.—*Continued.*	Public Schools	Separate Schools	Total
	$ c.	$ c.	$ c.
Waterford	129 00		129 00
Watford	169 00		169 00
Wellington	85 00		85 00
Weston	122 00	13 00	135 00
Winchester	141 00		141 00
Woodbridge	74 00		74 00
Woodville	62 00		62 00
Wyoming	89 00		89 00
Wroxeter	53 00		53 00
Total	14,051 00	993 00	15,044 00

SUMMARY OF APPORTIONMENT FOR 1903.

	COUNTIES.	Public Schools	Separate Schools	Total
		$ c.	$ c.	$ c.
1.	Brant	1,658 00		1,658 00
2.	Bruce	4,126 00	433 00	4,559 00
3.	Carleton	2,973 00	458 00	3,431 00
4.	Dufferin	1,969 00		1,969 00
5.	Elgin	3,016 00		3,016 00
6.	Essex	3,196 00	952 00	4,148 00
7.	Frontenac	2,296 00	180 00	2,476 00
8.	Grey	5,720 00	119 00	5,839 00
9.	Haldimand	1,824 00		1,824 00
10.	Haliburton	734 00		734 00
11.	Halton	1,423 00		1,423 00
12.	Hastings	4,000 00	80 00	4,080 00
13.	Huron	4,908 00	218 00	5,126 00
14.	Kent	3,859 00	221 00	4,080 00
15.	Lambton	3,990 00	32 00	4,022 00
16.	Lanark	2,241 00	47 00	2,288 00
17.	Leeds and Grenville	3,926 00	104 00	4,030 00
18.	Lennox and Addington	2,230 00	47 00	2,277 00
19.	Lincoln	1,639 00		1,639 00
20.	Middlesex	5,126 00	129 00	5,255 00
21.	Norfolk	2,509 00	48 00	2,557 00
22.	Northumberland and Durham	4,745 00	75 00	4,820 00
23.	Ontario	3,282 00	65 00	3,347 00
24.	Oxford	3,518 00		3,518 00
25.	Peel	1,880 00	13 00	1,893 00
26.	Perth	3,342 00	131 00	3,473 00
27.	Peterborough	2,272 00	20 00	2,292 00
28.	Prescott and Russell	2,127 00	1,877 00	4,004 00
29.	Prince Edward	1,557 00		1,557 00
30.	Renfrew	3,918 00	349 00	4,267 00
31.	Simcoe	6,004 00	127 00	6,131 00
32.	Stormont, Dundas and Glengarry	5,447 00	469 00	5,916 00
33.	Victoria	2,352 00		2,352 00
34.	Waterloo	2,543 00	286 00	2,829 00
35.	Welland	1,996 00		1,996 00
36.	Wellington	3,708 00	109 00	3,817 00
37.	Wentworth	2,647 00	11 00	2,658 00
38.	York	4,986 00	28 00	5,014 00
	Total	119,687 00	6,628 00	126,315 00
39.	Districts—			
	(a) Algoma, Muskoka, Nipissing, Parry Sound, Rainy River, Thunder Bay	Localities not in the towns and villages which appear in the general list.	1,200 00	40,000 00
	Total	38,800 00	1,200 00	40,000 00

GRAND TOTALS

Counties	119,687 00	6,628 00	126,315 00
Cities	47,445 00	11,851 00	59,296 00
Towns	35,669 00	6,206 00	41,875 00
Villages	14,051 00	993 00	15,044 00
Districts	38,800 00	1,200 00	40,000 00
Totals	255,652 00	26,878 00	282,530 00

II. ORDERS-IN-COUNCIL.

1. Section 105 of the Regulations of the Education Department as amended by Order-in-Council of 11th October, 1902, is further amended by adding thereto the following sub-section: "Subject to the preceding sub-section, the Minister of Education when a change in Text-books is deemed desirable, may submit to a Committee of the Educational Council, as hereinafter provided, for examination and report any or all books for which such authorization is sought. In the case of Text-books to be used in the Public Schools, the hereinbefore mentioned Committee shall consist of not more than five members, one of whom shall be the Inspector of Public Schools and two of them the Public School representatives on the said Educational Council. In the case of Text-books to be used in the High Schools and Collegiate Institutes, the Committee shall consist of not more than five members of which the High School representatives on the said Educational Council, and the President of the Collegiate and High School section of the Ontario Educational Association shall be members." (Approved 12th February, 1903.)

2. Normal School session extended. (Approved 18th February, 1903.)

3. Amendment to the requirements for specialists from Queen's University. (Approved 16th March, 1903.)

4. Provisional regulations governing Manual Training, Household Science, and Special Technical Instruction in Public, High and Technical Schools. (Approved 13th March, 1903.)

5. Amendment to the requirements for specialists from McMaster University. (Approved 20th March, 1903.)

6. Miss Mary Hope Merritt appointed teacher at the Ottawa Model School, on probation for two years. (Approved 28th April, 1903.)

7. Stenography and typewriting made optional subjects for the fifth form of the Public School Course. (Approved 17th June, 1903.)

8. Rearrangement of the inspectorates of Mr. Donald McCaig and Mr. William Houston, and appointment of Mr. John Ritchie as Inspector of Public Schools of the Districts of Rainy River and Thunder Bay, to take effect from 1st August, 1903. (Approved 24th June, 1903.)

9. High School established in the town of East Toronto. (Approved 13th July, 1903.)

10. Amendments to Regulations. (Circular 50.) (Approved 18th July, 1903.)

11. Private Schools and Colleges to be exempt from municipal taxation on compliance with regulations. (Approved 26th August, 1903.)

12. Regulations in re text-books. (Approved 11th September, 1903.)

13. Premier Partie and Deuxieme Partie of Methode Pratique de Lecture Ecriture, by T. Rochon, approved for use in the Roman Catholic French Schools. (Approved 11th September, 1903.)

14. Miss A. E. G. Wilson, teacher in Model School, Ottawa, transferred to the Toronto Model School and Miss Jennie Foster appointed teacher at the Ottawa Model School on probation for two years, said transfer and appointment to date from 1st April, 1903. Mr. Wilson A. Sorsoliel appointed teacher on probation for two years at the Toronto Model School, commencing 1st September, 1903. (Approved 11th September, 1903.)

15. The following persons appointed teachers of Manual Training in the Institutions named, for the present academic year: Mr. James H. Wilkinson, Toronto Normal School; Mr. James S. Harterre, Ottawa Normal School; Mr. Sugden Pickles, London Normal School; Mr. William Bailey, Hamilton Normal College. (Approved 7th Oct., 1903.)

16. Miss M. C. Macpherson appointed Teacher of Domestic Science at Normal College, Hamilton, for academic year 1903-4. Miss E. M. Macpherson appointed Clerk at Normal College, such appointment to take effect from 1st October, 1903. (Approved 21st October, 1903.)

17. Certificates to teach Household Science in the Public and High Schools granted, also a certificate to teach sewing. (Approved 21st October, 1903.)

18. A candidate for a Public School Inspector's certificate who is a graduate in Pedagogy and otherwise qualified is to be relieved of one year's teaching in High or Public Schools in order to obtain such certificate, which now requires five years' experience, three of which must be obtained in a Public School. (Approved 28th October, 1903.)

19. Appointments to Educational Council made. (Approved 29th October, 1903.)

20. Regulations in re School Gardens. (Approved 18th Nov., 1903.)

21. Miss Nina A. Ewing appointed Teacher of Household Economics in the Normal School, Toronto. (Approved 2nd December, 1903.)

22. Mr. Leslie Arnold Green, B.A., of the town of Sault Ste. Marie, appointed Inspector of Public Schools (vice Mr. William Houston, M.A., resigned) for the District of Algoma, with the exceptions of the Townships of Rutherford, Carlyle, Snider, Rayside, Creighton, Balfour, and Cartier, and the unorganized townships and unsurveyed portions of Algoma contiguous to the main line of the Canadian Pacific Railway, and of such other schools as may be designated from time to time by the Minister of Education.

The territory assigned Mr. Donald McCaig by Order-in-Council of 24th June is altered so that it now comprises the Island of St. Joseph, Manitoulin Island, and the Islands adjacent thereto, and the Townships of Rutherford and Carlyle in the District of Algoma, and such other schools as may be designated from time to time by the Minister of Education. (Approved 2nd December, 1903.)

23. Mr. James McDougall, B.A., of the town of North Bay, appointed Inspector of Public Schools in the District of Nipissing (except the townships of McCraney, Airy, Murchison, Sabine, and Lyell), and of the schools in the townships of Snider, Rayside, Creighton, Balfour, and Cartier, and of the unorganized townships and unsurveyed portions of Algoma contiguous to line of the Canadian Pacific Railway in the District of Algoma, with such other schools as may be added from time to time by the Minister of Education. Such appointment to take effect on and from 1st January, 1904.

Also re-adjustment of the inspectorates of Rev. Geo. Grant, B.A., S. Phillips, B.A., W. H. Stevens, B.A., and I. Day, B.A. (Approved 28th December, 1903.)

24. Vankleek Hill High School raised to the status of a Collegiate Institute. (Approved 28th December, 1903.)

25. Miss Alberta T. Freeman, the holder of a Class B (First Class) license to teach awarded by the Council of Public Instruction for Nova Scotia, granted a Public School Teacher's Second Class certificate. (Approved 28th December, 1903.)

26. Miss E. D. Lewis granted a certificate to teach Domestic Science. (Approved 31st December, 1903.)

APPENDIX G. *REPORT OF THE LIBRARIAN OF THE EDUCATION DEPARTMENT, 1903.*

To the Honorable Richard Harcourt, M.A., LL.D., K.C., Minister of Education for the Province of Ontario:—

I have the honor to submit herewith the Report on the Library of the Education Department for the year 1903, prepared at the request of the Librarian:

Yearly Record of Books Loaned to Students and Others.

The number of books given out to students and others varies considerably, as the following statistics for the years 1892-1903 illustrate. It is a matter of interest, however, to note the increasing number of educationists who use the Library for reference only, and as works of reference are not loaned, except in special cases, the yearly statistics of Books given out does not therefore afford an accurate record of the number of Books used during each year named.

Books given out in the month of—	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903
January	159	334	375	351	573	699	608	484	526	518	543	587
February	431	764	609	804	1,040	1,370	928	868	948	1,124	959	1,036
March	617	944	587	1,034	1,270	1,702	1,393	1,158	1,454	1,563	1,084	1,538
April	467	897	991	627	1,021	1,111	882	848	766	997	1,187	899
May	540	814	694	633	843	923	969	895	911	867	832	901
June	332	461	332	354	400	609	677	518	546	576	510	591
July	69	54	47	223	32	254	265	256	231	317	336	168
August	10	97	48	100	16	184	233	329	224	176	233	152
September	526	370	343	415	295	514	410	189	432	411	538	476
October	1,263	1,148	1,010	1,130	1,170	1,200	1,043	1,018	1,312	1,058	958	761
November	1,136	1,004	1,039	1,063	1,268	1,099	1,024	1,034	1,229	1,014	1,158	687
December	693	559	540	597	752	704	464	549	547	516	535	600
Totals	6,339	7,446	6,614	7,334	8,680	10,369	8,896	8,447	9,120	9,137	8,872	8,396

Number and Subjects of the Books Purchased in the Years 1892-1903.

Year.	Volumes.	Subjects.
1892	388	
1893	290	
1894	257	
1895	430	Education.
1896	495	Science.
1897	476	Literature.
1898	533	Art.
1899	315	Text-books.
1900	275	Miscellaneous.
1901	164	
1902	304	
1903	218	

The Number of Books Purchased in 1900-1903 was as follows:

Subjects.	1900	1901	1902	1903
Pedagogy	23	29	40	7
Science, (Political Economy, Anthropology, etc)	24	8	11	3
Philosophy and Ethics	5	12	9	8
Industrial and Domestic Science	23	2	8	6
Poetry	18	1	1	10
Fiction and Practical Life	26	5	9	19
Literature	78	3	46	35
Text-Books	65	32	45	27
Miscellaneous (History, Biography, Reference works)	13	72	102	61
" History and Nature Study	.....	.....	33	27
Art	.....	.....	.....	15
Totals	275	164	304	218

Number of Books Donated to the Library in 1898-1903:

	1898	1899	1900	1901	1902	1903
Text-Books	49	74	65	111	41	144
Miscellaneous	.....	.....	7	13	54	95
Totals	49	74	72	124	95	239

Newspapers and Magazines Received during the Years 1900-1903:

	1900	1901	1902	1903
Number of daily and weekly newspapers received	86	91	88	89
Number of magazines and other periodicals received	100	102	100	111
Totals	186	193	188	200

Books, Magazines, etc., Bound during the Years 1893-1903:

1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903
109	136	141	98	99	90	94	37	83	71	4

Official Reports on Education in Different Countries Received during 1901-1903:

	1901	1902	1903
Great Britain and Ireland	26	43	53
Various Provinces of the Dominion	42	42	45
Australasia:			
Victoria	.....	5	3
New South Wales	1	3	.....
South Australia	.....	1	1
Western Australia	1	1	2
Queensland	1	.....	.....
Tasmania	1	1	.....
New Zealand	9	29	18
Other British Possessions:			
Mauritius	.....	1	.....
Cape of Good Hope	1	1	2
Natal	1	1	1
Jamaica	2	1	1
Cape Town	.....	.....	12
Barbadoes	1	1	1
British Guinea	1	2	1
Straits Settlements	1	.....	.....
Hong Kong	.....	1	.....
Various States of the American Union	117	54	81
Miscellaneous:			
Brazil	.....	3	.....
Argentine Republic	16	12	10
Uruguay	1	.....	5
France	.....	8	4
Germany	1	.....	1
Portugal	.....	2	2
Switzerland	4	6	2
Italy	19	29	16
Mexico	.....	1	.....
Japan	1	.....	2
Totals	247	248	263

Miscellaneous Pamphlets Received in 1901-1903:

	1901	1902	1903
From various Countries	80	75	65
From the Dominion of Canada and its Provinces	28	74	53
Totals	108	149	118

General Remarks.

The tenth volume of the "Documentary History of Education in Upper Canada," 1851-52, was issued during the year, and, as stated in the Preface: "A glance at the contents will show how numerous were the subjects relating to Education which occupied the attention of our Public Men of fifty years ago."

Early in May last a Circular was issued, as authorized, and sent to all the leading Universities, Academies and Colleges of the Dominion, setting forth that duplicate Reports of the Minister of Education for this Province, as well as Provincial School Acts and Regulations of previous year, and Documentary History of Education for Upper Canada (except volume one), together with other Official Provincial and Dominion Reports, were available for distribution.

In response to this Circular some forty replies were received from every Province of the Dominion, as well as from Newfoundland, and, early in November, the distribution was made, care being taken in each instance to send as nearly as possible the Documents asked for. A record of all the Reports sent is on file in the Department.

In conclusion I might add that the Tables containing a number of Illustrated Books of various kinds provided for the Library have been much appreciated by the students of the Normal, Model and Provincial Kindergarten Schools, as well as by Visitors in general.

F. F. EVANS,

For the Librarian.

Toronto, December, 1903.

APPENDIX H. TECHNICAL EDUCATION—PUBLIC AND FREE LIBRARIES, ART SCHOOLS, LITERARY AND SCIENTIFIC INSTITUTIONS, ETC.

Report of S. P. May, M.D., C.L.H., Superintendent of Public Libraries, Art Schools, Etc.

Sir,—I have the honor to submit herewith my report on the Public and Free Libraries, Art Schools and Scientific Institutions receiving a share of the Government Grant, in the Province of Ontario:—

The recent change in the Act and Regulations requiring annual Reports from Public Libraries to be made up to the end of each calendar year has proved to be very satisfactory, except in a few Libraries which continue to pay subscriptions for magazines, newspapers, etc., in different months in the year. As Government Grants are only allowed for purchases up to the end of each calendar year, this causes considerable extra correspondence, which could be avoided if all subscriptions terminated on the 31st of December in each year.

The present Report is for the year ending 31st December, 1902.

The grant voted by the Legislature to pay Libraries for 1902 was $50,000, but it was not sufficient to pay claims in full; this is not owing so much to the increase of Libraries as it is to a larger number of Libraries qualifying for grants in 1902; for example, in 1901 only 405 Libraries applied for grants. In 1902, 446 Libraries applied for grants, and it is to be noticed that a large number of rural Libraries purchased books to the maximum grant for books, $200; it therefore became necessary to take off a pro rata reduction of 30 per cent. from all Libraries.

As shown by lists Nos. 1 to 6, the Libraries now in operation are as follows:

1. Public Libraries (free) paid grants for 1902	137
2. Public Libraries (free) reported but not entitled to grants for 1902	3
3. Public Libraries (not free) paid grants for 1902	292
4. Public Libraries (not free) reported but not entitled to grant for 1902	14
5. Public Libraries which did not report in 1902	35
6. Public Libraries incorporated in 1903	7
Total	488

137 Public Libraries (Free) were paid Grants for 1902, viz:—

Acton, Ailsa Craig, Algonquin, Alton, Alvinston, Arnprior, Aylmer, Ayr, Beeton, Berlin, Bloomsburg, Bothwell, Bracebridge, Brampton, Brantford, Brighton, Brockville, Brussels, Burk's Falls, Caledon, Caledonia, Camden East, Cardinal, Carleton Place, Cayuga, Chatham, Chesley, Chesterville, Clifford, Clinton, Cobden, Collingwood, Copleston, Cornwall, Creemore, Deseronto, Dehli, Drayton, Dutton, Erin, Exeter, Fordwich, Forest, Galt, Garden Island, Georgetown, Glencoe, Goderich, Gore Bay, Grand Valley, Grantham, Gravenhurst, Grimsby, Guelph, Hagersville, Hamilton, Harriston, Hespeler, Holyrood, Ingersoll, Iroquis, Kemptville, Kingsville, Lakefield, Lanark, Lancaster, Leamington, Lindsay, Listowel, Little Current, London, Lucknow, Markdale, Marlbank, Merrickville, Merritton, Midland, Millbrook, Milverton, Mitchell, Napanee Mills, Newington, Niagara Falls South, North Bay, Oil Springs, Orangeville, Oshawa, Otterville, Paisley, Palmerston, Parkhill, Parry Sound, Pembroke, Penetanguishene, Picton, Port Carling, Port Colborne, Port Rowan, Prescott, Preston, Renfrew,

Richmond Hill, Ridgeway, Sarnia, Sault Ste. Marie, Seaforth, Shelburne, Simcoe, Smith's Falls, Springfield, Sprucedale, Stayner, Stouffville, Stratford, Streetsville, St. Catharines, St. Mary's, St. Thomas, Sundridge, Tamworth, Tara, Thessalon, Thornhill, Thorold, Toronto, Trenton, Uxbridge, Wallaceburg, Waterford, Waterloo, Watford, Westford, Wiarton, Windsor, Wingham, Wroxeter, Wyoming.

3 Public Libraries (Free) sent in Reports for 1902 but were not entitled to grants, viz.: —

Don, Nairn Centre, Tottenham.

292 Public Libraries (Not Free) were paid Grants for 1902, viz.:

Aberarder, Abingdon, Admaston, Addison, Alma, Allan's Mills, Allliston, Almonte, Amherstburg, Ancaster, Angus, Arkona, Arthur, Atwood, Auburn, Aurora, Avonmore, Baden, Badjeros, Barrie, Battersea, Bayham, Beachville, Beamsville, Beaverton, Belfountain, Belleville, Belwood, Bervie, Berwick, Blenheim, Bloomfield, Blyth, Bobcaygeon, Bolton, Bowmanville, Bracondale, Bradford, Bridgeburg, Bridgen, Brooklin, Brucefield, Bruce Mines, Bunyan, Burford, Burlington, Burnstown, Burritt's Rapids, Caistorville, Cambray, Campbellford, Canfield, Cannington, Cargill, Carp, Chapleau, Chatsworth, Cheapside, Cheltenham, Claremont, Clarksburg, Claude, Cobourg, Colborne, Cold Springs, Coldstream, Coldwater, Comber, Cookstown, Crysler, Dalhousie, Dorchester, Douglas, Dresden, Dromore, Drumbo, Dryden, Duart, Dundalk, Dundas, Dundella, Dungannon, Dunnville, Durham, Easton's Corners, Elgin, Elmira, Elmvale, Elmwood, Elora, Elphin, Embro, Emsdale, Ennotville, Essex, Fenella, Fenelon Falls, Fergus, Finch, Floradale, Fonthill, Forrester's Falls, Fort Erie, Fort Frances, Freelton, Gananoque, Glammis, Glen Allen, Glenmorris, Gore's Landing, Gorrie, Haileybury, Haliburton, Hanover, Harrow, Harrowsmith, Hawkesville, Hensall, Hepworth, Highgate, Highland Creek, Hillsburg, Hillsdale, Holstein, Honeywood, Huntsville, Inkerman, Inwood, Islington, Jarvis, Jasper, Kemble, Keswick, Kinburn, Kincardine, King, Kingston, Kinmount, Kirkfield, Lake Charles, Leroy, Linwood, Lion's Head, Little Britain, Lorne Park, Lynden, Maberley, Madoc, Manilla, Manitowaning, Manotick, Maple, Maitland, Markham, Marksville, Matilda, Maxwell and Feversham, Maxville, Meaford, Melancthon, Melbourne, Metcalfe, Middleville, Mildmay, Millgrove, Milton, Minden, Mississippi, Molesworth, Monkton, Moose Creek, Morrisburg, Morristown, Mount Albert, Mount Brydges, Mount Forest, Nanticoke, Napanee, Newboro', Newburgh, Newbury, New Durham, New Hamburg, Newmarket, Niagara, Niagara Falls, Norland, North Gower, Norwich, Norwood, Oakville, Oakwood, Odessa, Omemee, Ophir, Orillia, Owen Sound, Oxford Mills, Pakenham, Paris, Pelee Island, Perth, Peterborough, Petrolea, Pickering, Pinkerton, Plattsville, Point Edward, Poland, Port Arthur, Port Burwell, Port Credit, Port Dover, Port Elgin, Port Hope, Port Perry, Port Stanley, Powassan, Princton, Queensville, Rat Portage, Richmond, Ridgetown, Ripley, Riversdale, Rockwood, Rodney, Romney, Rosemount, Rosseau, Russell, Saltfleet, Scarboro', Schreiber, Scotland, Severn Bridge, Shakespeare, Shallow Lake, Shedden, Smithville, Southampton, South River, Sparta, Spencerville, Strathroy, St. George, St. Helen's, Sunderland, Sunnidale, Tavistock, Teeswater, Thamesford, Thamesville, Thedford, Thornbury, Thornloe, Thornton, Tilbury, Tillsonburg, Tiverton, Toronto Junction, Trout Creek, Underwood, Unionville, Vandorf, Vankleek Hill, Vars, Victoria, Victoria Mines, Wales, Walkerton, Walton, Wardsville, Warkworth, Waterdown, Watson's Corners, Webbwood, Welland, Welles-

ley, West Lorne, Westport, Weston, Wheatley, Whitby, White Lake, Williamstown, Wolfe Island, Woodbridge, Woodstock, Woodville, Yarker, Zephyr.

14 Public Libraries (Not Free) sent in Reports but were not entitled to Grants, viz.:—

Ethel, Harrington, Havelock, Kearney, Lucan, Kintore, Mallorytown, Mono Road, Munster, New Dundee, Orono, Vienna, Violet Hill, York.

35 Libraries did not Report for 1902:—

Athens, Baysville, Belmont, Binbrook, Bancroft, Bognor, Brougham, Cache Bay, Copper Cliff, Courtright, Dawson, Dufferin, Enterprise, Farren's Point, Flesherton, Forks of the Credit, Goulais Bay, Grantley, Hastings, Horning's Mills, Holland Centre, Inglewood, Jerseyville, Kars, Mono Centre, Mono Mills, Morewood, North Augusta, Orrville, Osnabruck Centre, Primrose, Tilbury East, Tweed, Winchester, Winchester Springs.

Two Public Libraries were closed:—Calabogie, Delora.

Seven new Libraries were incorporated in 1903, viz.:—Callender, Chepstow, East Toronto, Komoka, Priceville, Singhampton, Stirling.

I visited and inspected 193 Public Libraries, Art Schools, etc., in 1902 as follows:—

Abingdon, Addison, Alma, Algonquin, Amherstburg, Athens, Alvinston, Battersea, Burford, Belleville, Berlin, Beamsville, Berwick, Bervie, Bloomfield, Bolton, Bothwell, Bowmanville, Brantford, Bridgeburg, Brockville, Brooklin, Bruce Mines, Brussels, Burk's Falls, Burritt's Rapids, Camden East, Canfield, Cargill, Chatham, Cobden, Coboconk, Cobourg, Cold Springs, Coldstream, Collingwood, Cornwall, Crysler, Dresden, Drumbo, Dungannon, Dunnville, Durham, Dutton, Easton's Corners, Elgin, Elmira, Elmvale, Elora, Elphin, Ethel, Fenelon Falls, Fergus, Finch, Forester's Falls, Fort Erie, Galt, Garden Island, Glammis, Glencoe, Glenmorris, Gore's Landing, Grimsby, Hagersville, Hamilton, Harrowsmith, Havelock, Hespeler, Hillsdale, Holyrood, Honeywood, Horning's Mills, Ingersoll, Inwood, Jarvis, Jasper, Kemptville, Keswick, King, Kingston, Kinmount, Komoka, Lakefield, Lanark, Lancaster, Lefroy, Lindsay, Listowel, Little Britain, London, Lorne Park, Lucknow, Maberly, Maitland, Mallorytown, Manilla, Marlbank, Maxville, Melancthon, Melbourne, Merrickville, Merritton, Milton, Mississippi, Molesworth, Moose Creek, Napanee, Newboro', Newbury, New Dundee, New Durham, Newington, Niagara, Norland, North Bay, Norwood, Oakwood, Oakville, Oil Springs, Omemee, Orono, Oxford Mills, Palmerston, Paris, Parry Sound, Peterboro', Petrolea, Perth, Picton, Pinkerton, Poland, Port Burwell, Port Colborne, Port Credit, Port Perry, Prescott, Preston, Primrose, Renfrew, Richmond Hill, Ridgeway, Ripley, Rodney, Rosemont, Russell, St. George, St. Thomas, Sarnia, Seaforth, Severn Bridge, Shelburne, Smith's Falls, Smithville, Springfield, Strathcona, Stratford, Streetsville, Sundridge, Tamworth, Thamesville, Thessalon, Thornton, Thorold, Tilbury, Tilbury East, Tillsonburg, Trout Creek, Violet Hill, Victoria Mines, Vienna, Walkerton, Wallaceburg, Walton, Wardsville, Waterford, Waterloo, Watson's Corners', Webbwood, Welland, West Lorne, Westport, Whitby, Williamstown, Windsor, Wolfe Island, Wyoming, Yarker, Hamilton Art School, Hamilton Scientific Association, Kingston Art School, St. Thomas Art School.

REMARKS ON INSPECTION.

There is a great improvement in many of the Public Libraries, more particularly so, in rural districts. Library Boards with very few exceptions take a great interest in their Libraries; they are more careful in their selection of books than formerly, and seem anxious to conform with the regulations of this Department.

In my interviews I always urged upon the representatives of Libraries the importance of providing books suitable for young people, that in addition to special standard books on History, Biography, Voyages, Science, etc., which will assist them in preparing for their employments in after life, a kind of post-graduate education, they should purchase some books which will assist in making our people patriotic, and loyal to our King and country.

As some of the new Library Boards were not familiar with the regulations, they omitted having sign "Public Library," labelling and stamping books, providing glass cases for books in stores, Record books, etc., but all requirements were promised to be attended to without delay. (A copy of my report of inspection with requirements, etc., was sent to every Library inspected.) In many old Libraries I found a large number of dilapidated books, which in their present condition are unfit for circulation. I recommended that any of these worth re-binding should be re-bound, and explained that the Government Grant would be 50 per cent. on amount expended for binding, and that book which were incomplete and not worth re-binding should be destroyed and a list of the books destroyed entered on their next Annual Report.

Several Libraries had purchased books payable with notes, and had no funds to meet the pro rata reduction; for example:—A Library gave a note for $200.00, the grant was only $140, and they had no funds to make up the balance. These Library Boards promised me that they would give entertainments, and if necessary get private subscriptions, so that their notes should be paid before the end of the year.

As copies of the new Bill, May, 1903, (see below), had been sent to the Chairman and Secretary of every Public Library in the Province, Library Boards were prepared to discuss it.

AN ACT TO AMEND THE PUBLIC LIBRARIES ACT.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

"1. Section 28 of The Public Libraries Act is amended by inserting after sub-section 1 of the said section the following words:—

In estimating the amount to which a Public Library is entitled under sub-section 1 of this section, only the amounts expended by the board of management in cash payments out of moneys received by way of grant or gift or as membership fees shall be included, and no public library shall be entitled to any grant under the said sub-section by reason of the expenditure of money borrowed by the board of management or by reason of payments made in promissory notes or in any other way than by cash only.

2. Sub-section 3 of section 28 of The Public Libraries Act is repealed."

Sub-section 1 (28) caused considerable discussion pro and con; many of the Library Boards considered that if they were not allowed to purchase books to be paid for with notes, or borowed moneys, their Libraries would have to be closed, but I explained to them that the Minister of Education was working for their own benefit, that under the new Act it is probable that there

would be no pro rata reduction, that in future their financial position would be improved, that as books for Public Libraries are now imported free of duty, and books so much reduced in price, that in rural districts they need not purchase $200.00 worth of books every year in future, and that if a smaller amount was expended for books the selection would be apt to be more choice and more appreciated by their members.

I also stated that every Public Library receiving Government Grants should be assisted by the municipalities. In 1902, 289 Libraries were paid municipal grants. It is very gratifying to state that after my explanations the consensus of opinion was that the change in the law would be of benefit to the Libraries, and several Libraries which hitherto had not applied for municipal assistance determined that they would make application without delay.

As sub-section 2 (28) applies to evening classes only, it was not discussed.

The following Public Libraries (not free) were paid municipal grants for 1902:—

Abingdon, Admaston, Alma, Almonte, Amherstburg, Ancaster, Angus, Arkona, Arthur, Atwood, Auburn, Baden, Badjeros, Barrie, Beaverton, Belfountain, Belleville, Bervie, Blenheim, Blyth, Bobcaygeon, Bolton, Bowmanville, Bracondale, Bridgeburg, Brigden, Brooklin, Brucefield, Bunyan, Burlington, Caistorville, Cambray, Campbellford, Canfield, Cannington, Cargill, Carp, Claremont, Cobourg, Cold Springs, Coldstream, Coldwater, Comber, Cookstown, Dresden, Duart, Dundas, Dungannon, Dunnville, Elora, Embro, Ensdale, Ennotville, Essex, Ethel, Fenelon Falls, Fergus, Fonthill, Fort Erie, Fort Frances, Gananoque, Glammis, Glen Allan, Glenmorris, Gorrie, Haliburton, Hanover, Harrow, Harrowsmith, Heensall, Hepworth, Highgate, Honeywood, Huntsville, Islington, Kincardine, Kingston, Kinmount, Kintore, Kirkfield, Lefroy, Linwood, Lion's Head, Little Britain, Lorne Park, Lucan, Manilla, Manitowaning, Maple, Marksville, Maxwell and Feversham, Meaford, Melbourne, Mildmay, Minden, Molesworth, Monkton, Morrisburgh, Mount Forest, Napanee, Newburg, New Hamburg, New Dundee, Newmarket, Niagara Falls, Norwich, Norwood, Oakville, Oakwood, Omemee, Orillia, Pakenham, Paris, Perth, Pickering, Pinkerton, Point Edward, Port Arthur, Port Credit, Port Elgin, Port Perry, Rat Portage, Ridgetown, Ripley, Riversdale, Rodney, Romney, Saltfleet, Smithville, Southampton, South River, Strathroy, St. George, St. Helens, Sunderland, Teeswater, Thamesford, Thamesvile, Thornbury, Thornton, Tilbury, Tillsonburg, Toronto Junction, Underwood, Walkerton, Walton, Wardsville, Warkworth, Waterdown, Welland, West Lorne, Weston, Wheatley, Whitby, Williamstown, Woodstock, Woodville, York.

The following Public Libraries (Free) were paid municipal grants in 1902:—

Acton, Ailsa Craig, Arnprior, Aylmer, Ayr, Beeton, Berlin, Bothwell, Bracebridge, Brampton, Brantford, Brighton, Brockville, Brussels, Burk's Falls, Caledonia, Camden East, Cardinal, Carleton Place, Cayuga, Chatham, Chesley, Chesterville, Clifford, Clinton, Cobden, Collingwood, Copleston, Cornwall, Creemore, Deserento, Delhi, Don, Drayton, Dutton, Erin, Exeter, Fordwich, Forest, Galt, Garden Island, Georgetown, Glencoe, Goderich, Gore Bay, Grand Valley, Grantham, Gravenhurst, Grimsby, Guelph, Hagersville, Hamilton, Harriston, Hespeler, Holyrood, Ingersoll, Iroquois, Kemptville, Kingsville, Lakefield, Lanark, Lancaster, Leamington, Lindsay, Listowel, Little Current, London, Lucknow, Markdale, Merrickville, Merritton, Midland, Millbrook, Milverton, Mitchell, Niagara Falls South, North Bay, Oil Springs, Orangeville, Oshawa, Otterville, Paisley, Palmer-

ston, Parkhill, Parry Sound, Pembroke, Penetanguishene, Picton, Port Carling, Port Colborne, Port Rowan, Prescott, Preston, Renfrew, Richmond Hill, Ridgeway, Sarnia, Sault Ste. Marie, Seaforth, Shelburne, Simcoe, Smith's Falls, Springfield, Sprucedale, Stayner, Stouffville, Stratford, Streetsville, St. Catharines, St. Mary's, St. Thomas, Sundridge, Tamworth, Tara, Thessalon, Thornhill, Thorold, Toronto, Trenton, Uxbridge, Wallaceburg, Waterford, Waterloo, Watford, Westford, Wiarton, Windsor, Wingham, Wroxeter, Wyoming.

Total, 289 Free and Public Libraries were paid Municipal Grants in 1902.

The above statement is very gratifying as it shows that a large number of Municipalities now subscribe towards the maintenance of Libraries in their own localities. This year, 1903, the Municipal Grants will be largely increased, as quite a number of new Library buildings are being erected through the Province from funds donated by Mr. Carnegie. The terms on which these buildings are being erected are:—

1. The City, Town, or Village to provide the site.

2. The City to pay 10 per cent. annually on the amount given by Mr. Carnegie.

I visited the following Library Buildings erected with Carnegie funds this year (1903):

1. Brantford. Carnegie grant, $30,000. A very fine building is being erected on a splendid site facing Victoria Park. Not finished when I visited Brantford.

2. Berlin. Carnegie grant, $23,000. Building in course of erection when I visited Berlin.

3. Chatham. Carnegie grant $18,000. The original grant was $15,000 but it was found after tenders had been received that this sum was not sufficient, and the Board applied to Mr. Carnegie, who gave them an additional grant of $3,000. The building will cost about $20,000. It was dedicated by the Hon. Minister of Education on the 14th September, 1903.

It is a very handsome stone building, with cut-stone front. On the ground floor is the main entrance and vestibule, with delivery hall in the centre, fitted with oak and glass panelling dividing the rooms on each side and leading up to the delivery desk. On one side is the general reading room and reference room; on the opposite side, the children's reading room and librarian's room. In the rear is the library, or stock room, of a half circular form lighted with 12 large windows. This room has sufficient shelving for 40,000 volumes. The fittings are up to date, steel with polished wood shelves. The library is 20 feet in height, ceilings (also in basement) pressed steel.

The basement contains entrance hall with access from the street or from the vestibule. The Board room is in the centre, with boiler and fuel rooms on one side; on the opposite side, newspaper room and un-packing room with lift, etc. In the rear is a large auditorium, 15 feet high, with seating accommodation for 300 persons. The end of this room is the same as the library of a half circular form with 12 large windows.

The entire building is well lighted with gas and electric lights, and has modern plumbing, closets, wash rooms, etc., also fire places, giving it a cheerful and bright appearance in winter.

4. Collingwood. Carnegie grant, $12,500. Cost of building to be about $15,000. Building not finished when I visited Collingwood.

5. Cornwall. Carnegie grant, $7,000. This Library is now open to the public. The building is built of red brick with stone facings and stone foundation. It is erected on a prominent site. They have separate Reading

Rooms for ladies and gentlemen, a spacious entrance hall and board room, with well equipped Library, and good rooms in the basement.

6. Galt. Carnegie grant, $19,500. The building was in course of erection when I visited Galt.

7. Lindsay. Carnegie grant, $13,000. Building in course of erection when I visited Lindsay.

8. Palmerston. Carnegie grant, $10,000. Building in course of erection when I visited Palmerston.

9. Sarnia. Carnegie grant $15,000. Opened to the public 27th November, 1903. The entrance hall is of an ornate character, the walls are decorated, and it is intended to have busts of distinguished men ornamenting each of the pilasters. The Library has modern equipments. Reading Room well lighted and ventilated. Separate Reading Room for children, also separate reference room on first floor. In the basement they have an auditorium, amusement and newspaper room, storeroom, lavatory, etc.

10. Smith's Falls. Carnegie grant, $11,000. The building is being erected on a triangular block facing two streets on a leading thoroughfare. Messrs. Frost Bros. having entered into agreement to give $1,000 per annum for 20 years towards the maintenance of the Library, therefore the town will have only a small amount to subscribe annually.

11. Stratford. Carnegie grant, $15,000. This Library was opened in September, 1903. It is a good plain substantial red brick building with stone trimmings. They have an excellent entrance hall, well equipped Library, also reference Library and spacious Reading Room well lighted, with separate children's room. Excellent auditorium well lighted and ventilated; janitor's apartments in the basement, store room, lavatory, etc. Readers are allowed to select books from the shelves, except fiction, and can take out two books at a time, but only one on fiction.

12. Waterloo. Carnegie grant, $10,000. Building in course of erection when I visited Waterloo.

13. Windsor. Carnegie grant, $27,000. (Dedicated by the Minister of Education.) The entrance hall is very chaste; on the ground floor they have a spacious Library and a general Reading Room, reference room, newspaper room, etc. In the basement a spacious, well lighted and ventilated auditorium, which will seat 300 people. The building is heated with steam. The lady librarians are painstaking, obliging and careful; everything is bright, clean and cheerful.

Readers are allowed to select books from the shelves, including fiction.

The citizens may well feel proud of their Free Library.

I am informed that several other buildings are being erected with Carnegie funds, but the Department has not yet received official communications respecting them.

Other New Library Buildings.

1. Amherstburg. They have an excellent brick building which has been modernized and fitted up for Library purposes. They received an endowment from the late Dr. Boyle which enabled them to fit up their building, which is not only free of debt but is a source of revenue. They have a large Library and spacious Reading Room. At present they do not require all the rooms for Library purposes, therefore the rooms on the ground floor are rented to the School Board for Continuation Classes. As they receive a town grant of $100, and a county grant of $50 per annum, their financial position is probably equal to any other Public Library in the Province. They have an excellent Library, which, in addition to modern standard

books, contains a valuable collection of rare and valuable books, engravings, etc., presented by the late Dr. Boyle.

2. Lancaster. They have an excellent brick building with modern equipments; it was opened on the 19th November, when I gave an address on ancient and modern libraries, and Mr. Dingwall and others gave interesting addresses on the best books to read, etc. The building, which is well laid out, properly ventilated and lighted, cost only $3,000. Mr. Ross, a former resident, gave a donation of $1,000, also a town lot, and it is expected that local contributions will enable them to pay off all liabilities before the end of the year.

3. Napanee. They have an excellent building, erected at the expense of subscribers; it is so well fitted up that it may be considered a model library building for small towns. It is not a Free Library, but the Reading Room and Reference room are free. The town grant is $200, which, in addition to members' fees, places them in a good financial position. The Library and Reading Room are spacious and fitted up with modern equipments. They have a Board room, Reference room, Amusement room, etc., and the Library Board are to be congratulated on their success in erecting a building free of all liabilities so well adapted to their purposes.

4. Newington. They have an excellent brick building which cost about $1,700, donated by a former resident. The Library and Reading Room are in one large room on the ground floor, but the Library is partitioned off with railings so that members cannot have access to the book shelves. The people may well be proud of their Library, which, they say, will live forever as a monument of the generosity of the donor who was one of their townsmen.

The following table shows the locality of every Public and Free Library in the Province up to the 1st December, 1908.

FREE AND PUBLIC LIBRARIES.

Counties and Districts.	Cities, Towns and Villages.
Addington	Camden, East.
"	Enterprise.
"	Napanee Mills (Strathcona P.O.)
"	Newburgh.
"	Tamworth.
"	Yarker.
Algoma	Bruce Mines.
"	Chapleau.
"	Goulais Bay.
"	Marksville.
"	Nairn Centre.
"	Ophir.
"	Port Arthur.
"	Rat Portage.
"	Sault Ste. Marie.
"	Schrieber.
"	Thessalon.
"	Victoria Mines.
"	Webbwood.
Brant	Brantford.
"	Burford.
"	Glenmorris.
"	New Durham.
"	Paris.
"	Scotland.
"	St. George
Bruce	Berrie.
"	Cargill.
"	Chepstow.
"	Chesley.
"	Elmwood.
"	Clemmis
"	Henworth.
"	Holyrood.
"	Kincardine
"	Lion's Head.
"	Lucknow
"	Mildmay
"	Paisley.
"	Pinkerton.
"	Port Elgin.
"	Pipley.
"	Riversdale
"	Southampton.
"	Teeswater.
"	Tara.
"	Tiverton.
"	Underwood.
"	Walkerton.
"	Westwood.
"	Wiarton.
Carleton	Carp.
"	Dawson.
"	Kars.
"	Kinburn.
"	Manotick.
"	Metcalfe.
"	Munster.
"	North Gower.
"	Richmond.
Dufferin	Grand Valley.
"	Honeywood.
"	Horning's Mills.
"	Melancthon.
"	Mono Centre.
"	Orangeville.
Dufferin	Primrose.
"	Rosemont.
"	Shelburne.
"	Violet Hill.
Dundas	Chesterville.
"	Dundela
"	Grantley.
"	Inkerman.
"	Iroquois.
Dundas	Matilda (Iroquois P.O.)
"	Morewood.
"	Morrisburg.
"	Winchester.
"	Winchester Springs.
Durham	Bowmanville.
"	Millbrook.
"	Orono.
"	Port Hope.
Elgin	Aylmer.
"	Bayham.
"	Dutton.
"	Port Burwell.
"	Port Stanley.
"	Rodney.
"	St. Thomas.
"	Shedden.
"	Sparta.
"	Springfield.
"	Vienna.
"	West Lorne.
Essex	Amherstburg
"	Comber.
"	Essex.
"	Harrow.
"	Kingsville.
"	Leamington.
"	Pelee Island.
"	Windsor.
Frontenac	Battersea.
"	Garden Island.
"	Harrowsmith.
"	Kingston.
"	Miss'ssippi.
"	Wolfe Island.
Glengarry	Lancaster.
"	Maxville.
"	Williamstown.
Grenville	Algonquin.
"	Burritt's Rapids.
"	Cardinal.
"	Easton's Corners.
"	Jasper.
"	Kemptville.
"	Maitland.
"	Merrickville.
"	North Augusta.
"	Oxford Mills.
"	Prescott.
"	Spencerville.
Grey	Badjeros.
"	Bognor.
"	Chatsworth.
"	Clarksburg.
"	Dromore.
"	Durham.
"	Dundalk.
Grey	Flesherton.
"	Holland Centre.
"	Holstein.
"	Kemble.
"	Hanover.
"	Lake Charles.
"	Markdale.
"	Meaford.
"	Maxwell and Feversham.
"	Owen Sound.
"	Priceville.
"	Shallow Lake.
"	Singhampton.
"	Thornbury.
Haliburton	Haliburton.
"	Minden.
Haldimand	Caledonia.
"	Canfield.
"	Cayuga.

Free and Public Libraries.—*Continued.*

Counties and Districts.	Cities, Towns and Villages.
Haldimand	Cheapside.
"	Dufferin (Clanbrassil P. O.)
"	Dunnville.
"	Hagersville.
"	Jarvis.
"	Nanticoke.
"	Victoria (Caledonia P. O.)
"	York.
Halton	Acton.
"	Burlington.
"	Georgetown.
"	Milton.
"	Oakville.
Hastings	Bancroft.
"	Belleville.
"	Deseronto.
"	Madoc.
"	Marlbank.
"	Stirling.
"	Trenton.
"	Tweed.
Huron	Auburn.
"	Brucefield.
"	Blyth.
"	Brussels.
"	Clinton.
"	Dungannon.
"	Ethel.
"	Exeter.
"	Fordwich.
"	Goderich.
"	Gorrie.
"	Hensall.
"	Molesworth.
"	Seaforth.
"	St. Helens.
"	Walton.
"	Wingham.
"	Wroxeter.
Kent	Blenheim.
"	Bothwell.
"	Chatham.
"	Dresden.
"	Duart.
"	Highgate.
"	Tilbury.
"	Tilbury E. (Valetta P. O.)
"	Ridgetown.
"	Romney.
"	Thamesville.
"	Wallaceburg.
"	Wheatley.
Lambton	Arkona.
"	Aberarder.
"	Alvinston.
"	Brigden.
"	Bunyan.
"	Copleston.
"	Courtwright.
"	Forest.
"	Inwood.
"	Oil Springs.
"	Petrolea.
"	Point Edward.
"	Sarnia.
"	Thedford.
"	Watford.
"	Wyoming.
Lanark	Allan's Mills.
"	Almonte.
"	Carleton Place.
"	Dalhousie.
"	Elphin.
"	Lanark.
"	Maberley.
"	Middleville.
"	Pakenham.
"	Perth.
"	Poland.
"	Smith's Falls.
Lanark	Watson's Corners.
Leeds	Addison.
"	Athens.
"	Brockville.
"	Elgin.
"	Gananoque.
"	Mallorytown.
"	Newboro'.
"	Westport.
Lennox	Odessa.
"	Napanee.
Lincoln	Abingdon.
"	Beamsville.
"	Caistorville.
"	Grantham (St. Catharines P. O.)
"	Merritton.
"	Grimsby.
"	Niagara.
"	Smithville.
"	St. Catharines.
Manitoulin I	Gore Bay.
"	Little Current.
"	Manitowaning.
Middlesex	Ailsa Craig.
"	Belmont.
"	Coldstream.
"	Dorchester.
"	Glencoe.
"	Komoka.
"	London.
"	Lucan.
"	Melbourne.
"	Mt. Brydges.
"	Newbury.
"	Parkhill.
"	Strathroy.
"	Wardsville.
Muskoka	Bracebridge.
"	Baysville.
"	Gravenhurst.
"	Huntsville.
"	Port Carling.
"	Severn Bridge.
Nipissing	Copper Cliff.
"	Cache Bay.
"	Haileybury.
"	North Bay.
"	Thornloe.
Norfolk	Bloomsburg.
"	Delhi.
"	Port Dover.
"	Port Rowan.
"	Simcoe.
"	Waterford.
Northumberland	Brighton.
"	Campbellford.
"	Cobourg.
"	Cold Springs.
"	Colborne.
"	Fenella.
"	Gore's Landing.
"	Warkworth.
Ontario	Beaverton.
"	Brooklin.
"	Brougham.
"	Cannington.
"	Claremont.
"	Oshawa.
"	Pickering.
"	Port Perry.
"	Sunderland.
"	Uxbridge.
"	Whitby.
"	Zephyr.
Oxford	Beachville.
"	Drumbo.
"	Embro.
"	Harrington.
"	Ingersoll.

FREE AND PUBLIC LIBRARIES.—*Continued.*

Counties and Districts.	Cities, Towns and Villages.
Oxford	Kintore.
"	Plattsville.
"	Norwich.
"	Otterville.
"	Princeton.
"	Tavistock.
"	Tillsonburg.
"	Thamesford.
"	Woodstock.
Parry Sound	Burk's Falls.
"	Callender.
"	Emsdale.
"	Kearney.
"	Orrville.
"	Parry Sound.
"	Powassan.
"	Rosseau.
"	South River.
"	Sprucedale.
"	Sundridge.
"	Trout Creek.
Peel	Alton.
"	Belfountain.
"	Bolton.
"	Brampton.
"	Caledon.
"	Cheltenham.
"	Claude.
"	Forks of the Credit.
"	Inglewood.
"	Lorne Park.
"	Mono Road.
"	Mono Mills.
"	Port Credit.
"	Streetsville.
Perth	Atwood.
"	Listowel
"	Milverton.
"	Monkton.
"	Mitchell.
"	Shakespeare.
"	St. Mary's.
"	Stratford.
Peterborough	Hastings.
"	Havelock.
"	Lakefield.
"	Norwood.
"	Peterborough.
Prescott	Vankleek Hill.
Prince Edward	Bloomfield.
"	Picton.
Rainy River	Dryden.
"	Fort Frances.
Renfrew	Admaston.
"	Arnprior.
"	Burnstown.
"	Cobden.
"	Douglas.
"	Forester's Falls.
"	Pembroke.
"	Renfrew.
"	White Lake.
Russell	Russell.
"	Vars.
Stormont	Avonmore.
"	Berwick.
"	Cornwall.
"	Crysler.
"	Farran's Point.
"	Finch.
"	Moose Creek.
"	Newington.
"	Osnabruck Centre.
"	Wales.
Simcoe	Alliston.
"	Angus.
"	Barrie.
"	Beeton.
"	Bradford.
"	Coldwater.
Simcoe	Collingwood.
"	Cookstown.
"	Creemore.
"	Elmvale.
"	Hillsdale.
"	Lefroy.
"	Midland.
"	Orillia.
"	Penetanguishene.
"	Stayner.
"	Sunnidale (New Lowell P. O.)
"	Thornton.
"	Tottenham.
Victoria	Bobcaygeon.
"	Cambray.
"	Fenelon Falls.
"	Kinmount.
"	Kirkfield.
"	Little Britain.
"	Lindsay.
"	Manilla.
"	Norland.
"	Oakwood.
"	Omemee.
"	Woodville.
Waterloo	Ayr.
"	Baden.
"	Berlin.
"	Elmira.
"	Floradale.
"	Galt.
"	Hawkesville.
"	Hespeler.
"	Linwood.
"	New Dundee.
"	New Hamburg.
"	Preston.
"	Waterloo.
"	Wellesley.
Welland	Bridgeburg.
"	Fonthill.
"	Fort Erie.
"	Niagara Falls.
"	Niagara Falls South.
"	Port Colborne.
"	Ridgeway.
"	Thorold.
"	Welland.
Wellington	Alma.
"	Arthur.
"	Belwood.
"	Clifford.
"	Drayton.
"	Elora.
"	Erin.
"	Ennotville.
"	Fergus.
"	Glen Allen.
"	Guelph.
"	Harriston.
"	Hillsburg.
"	Morriston.
Wellington	Mount Forest.
"	Palmerston.
"	Rockwood.
Wentworth	Ancaster.
"	Binbrook.
"	Dundas.
"	Freelton.
"	Hamilton.
"	Jerseyville.
"	Mill Grove.
"	Lynden.
"	Saltfleet (Stony Creek P. O.)
"	Waterdown.
York	Aurora.
"	Bracondale.
"	Don.
"	East Toronto.
"	Highland Creek.

Free and Public Libraries.—*Concluded.*

Counties and Districts.	Cities, Towns and Villages.
York	Islington.
"	Keswick.
"	King.
"	Maple.
"	Markham.
"	Mount Albert.
"	Newmarket.
"	Queensville.
"	Richmond Hill.
York	Scarboro.
"	Stouffville.
"	Thornhill.
"	Toronto.
"	Toronto Junction.
"	Unionville.
"	Vandorf.
"	Weston.
"	Woodbridge.

The above list may be classified as follows:—

Public Libraries reporting	306
Free Libraries reporting	140
Public Libraries not reporting	31
Free Libraries not reporting	4
Public Libraries incorporated since 31st Dec., 1902.	7
Total	488

I. PUBLIC LIBRARIES (NOT FREE).

The following extracts are taken from the annual reports for the year ending 31st December, 1902. (For details see table A).

1. Classification of Public Libraries Reporting.

Public Libraries with reading rooms	99
Public Libraries without reading rooms	207
Total	306

2. Public Libraries—Receipts and Balances on hand.

The total receipts of 306 Public Libraries was	$90,809 55
Balances on hand	5,659 32

3. Public Libraries—Expenditure.

The total expenditure of 306 Public Libraries was	$85,150 23

4. Public Libraries—Assets and Liabilities.

Assets of 306 Public Libraries	$426,103 88
Liabilities of 306 Public Libraries	28,458 33

5. Number of Members in Public Libraries.

306 Public Libraries have 40,875 members.

6. No of Volumes in Public Libraries and No. of Volumes Issued.

Number of volumes in 306 Libraries	535,528
Number of volumes issued in 306 Libraries	855,669

7. Reading Rooms in Public Libraries.

99 Libraries reporting have reading rooms.
*18 Libraries reported having periodicals for circulation.
117 Libraries subscribed for 2,375 newspapers and periodicals.

*A circular was recently issued by the Department giving Libraries without Reading Rooms the privilege of purchasing magazines for circulation, the same as books.

TABLE A.—Receipts, Expenditure, Assets and Liabilities, etc., of Public Libraries (not Free) for the year ending 31st December, 1902.

No.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in Library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
1	Aberarder	36 80	.....	50 00	48 05	134 85	116 02	8 83	102	3,253	2,073	26	1,371 00	183 38
2	Abingdon	.....	10 00	50 00	115 66	175 66	176 66	.....	115	279	473	.....	169 87	119 00
3	Admaston	17 60	10 00	17 00	24 67	99 27	76 93	22 34	150	1,249	1,358	.....	700 00	.....
4	Addison	.....	.....	42 50	172 92	215 42	215 42	.....	101	318	521	.....	200 00	200 00
5	Alma	107 55	18 00	43 75	53 01	222 31	214 53	7 78	134	1,023	2,532	16	920 00	2 00
6	Allan's Mills	19 65	.....	9 75	16 36	45 76	36 67	9 09	106	464	482	.....	325 00	.....
7	Alliston	57 05	.....	61 65	.....	118 70	118 70	.....	117	1,970	3,266	.....	1,496 89	18 90
8	Almonte	145 95	150 00	129 00	94 70	519 65	519 65	.....	132	3,472	5,028	21	3,664 50	.....
9	Amherstburg	157 20	150 00	81 62	114 70	503 52	506 52	.....	194	2,946	2,348	23	1,951 00	26 90
10	Ancaster	60 00	25 00	25 00	83 83	193 83	175 70	18 13	104	681	1,610	.....	526 90	70 00
11	Angus	62 00	20 00	15 75	17 65	115 40	91 02	21 38	100	599	699	10	400 00	.....
12	Arkona	16 75	15 00	13 00	222 35	267 10	263 64	3 46	115	2,321	3,071	16	1,200 00	180 07
13	Arthur	134 20	100 00	97 50	221 11	553 11	534 68	18 43	179	2,914	3,380	20	2,051 00	166 26
14	Atwood	147 10	15 00	26 75	129 50	318 35	316 87	1 48	198	1,571	6,610	.....	1,295 32	142 92
15	Aubrey	70 75	30 00	30 15	155 52	286 42	286 42	.....	100	1,128	1,886	12	802 83	228 01
16	Aurora	95 10	.....	73 75	101 31	273 16	264 44	8 72	105	2,949	4,360	.....	3,811 72	1,057 00
17	Avonmore	160 00	.....	80 00	57 65	297 65	254 92	42 73	153	1,294	3,181	.....	720 03	226 00
18	Baden	116 70	35 00	51 00	115 93	318 63	318 63	.....	102	2,900	1,845	.....	1,565 53	65 93
19	Badjeros	160 00	10 00	31 75	201 77	406 52	397 21	9 31	129	667	1,380	3	370 64	178 16
20	Barrie	200 00	150 00	226 75	393 26	970 01	937 29	32 72	226	4,591	9,955	28	4,896 00	300 00
21	Battersea	.....	.....	25 50	223 99	248 49	248 49	.....	101	277	231	.....	253 23	12 99
22	Bayham	65 85	.....	26 50	19 02	111 37	87 39	23 98	105	699	1,157	.....	503 74	.....
23	Beachville	160 00	.....	51 00	225 10	436 10	432 24	416	212	542	1,908	.....	421 75	218 25
24	Beamsville	120 00	.....	78 50	115 61	314 11	308 70	541	150	2,311	3,199	6	2,187 19	145 27
25	Beaverton	115 80	55 00	46 30	80 04	297 14	286 69	10 45	115	1,404	2,610	24	1,196 86	131 00
26	Bellemountain	160 00	30 00	17 50	5 00	212 50	212 50	.....	175	2,193	1,995	.....	1,800 50	.....
27	Belleville	200 00	200 00	350 72	400 43	1,151 15	1,129 99	21 16	986	4,960	17,726	30	4,000 00	206 01
28	Belwood	93 10	.....	22 10	88 31	203 51	189 79	13 72	112	1,372	2,723	.....	1,127 18	25 00
29	Bervie	.....	25 00	12 50	118 74	156 24	135 62	20 62	103	1,352	516	.....	831 62	202 59
30	Berwick	160 00	.....	26 00	14 18	200 18	200 18	.....	104	740	592	.....	101 93	240 18
31	Blenheim	200 00	75 00	207 60	65 99	548 59	472 92	75 67	225	3,792	7,825	23	3,136 50	175 91
32	Bloomfield	133 70	.....	33 00	22 00	188 70	82 65	106 05	110	1,801	6,552	15	1,325 00	77 55
33	Blyth	.....	20 00	28 00	21 27	69 27	49 62	19 65	116	1,286	1,180	.....	566 15	.....
34	Boberyeson	12 45	60 00	66 25	63 27	201 97	193 20	8 77	138	2,202	2,775	21	1,921 64	30 00
35	Bolton	98 00	50 00	80 50	24 56	253 06	253 06	.....	161	2,825	5,060	15	1,692 24	24 56
36	Bowmanville	149 00	150 00	132 48	97 30	528 78	519 24	9 54	131	3,399	7,106	44	3,515 16	141 33
37	Brucedale	160 00	25 00	32 25	58 73	275 98	255 26	20 72	129	1,358	2,233	.....	881 74	100 07
38	Bradford	13 40	.....	13 25	1 77	88 42	88 19	23	131	2,193	3,353	.....	1,696 79	94 15
39	Bridgeburg	97 90	60 00	44 00	65 77	267 67	259 69	7 98	107	1,051	3,174	.....	664 67	.....
40	Brigden	160 00	30 00	17 55	27 71	235 26	230 41	4 85	188	722	4,213	.....	378 30	169 79

TABLE A.—Receipts, Expenditure, Assets and Liabilities, etc., of Public Libraries (not Free) for the year ending 31st December, 1902.—*Continued.*

No.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in Library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
41	Brooklin	160 00	50 00	35 00	64 56	309 56	305 29	4 27	174	1,997	2,910	2	1,168 93	60 00
42	Brucefield	160 00	45 00	27 80	15 39	248 19	248 19	.....	135	555	2,600	.....	359 71	2 57
43	Bruce Mines	160 00	.....	67 00	464 98	691 98	591 67	100 31	113	622	1,540	21	506 08	167 17
44	Bunyan	40 00	5 00	15 00	99 30	159 30	121 48	37 82	100	379	175	.....	250 00	.....
45	Burford	164 10	.....	75 75	249 99	489 84	488 11	1 73	105	1,799	2,459	20	1,217 65	150 11
46	Burlington	65 35	50 00	60 50	169 48	345 33	298 83	46 50	121	2,246	1,293	8	1,707 39	90 00
47	Burnstown	.....	.....	15 00	60 68	75 68	75 06	62	140	779	1,108	.....	370 06	.....
48	Burrit's Rapids	.....	.....	27 00	203 93	230 93	216 51	14 42	106	355	382	.....	228 93	293 93
49	Caistorville	101 65	30 00	13 75	17 45	162 25	157 65	4 60	110	379	1,061	.....	297 75	17 00
50	Cambray	80 60	50 00	18 50	4 55	153 65	153 65	.....	136	831	2,357	.....	594 14	4 41
51	Campbellford	133 30	130 00	122 34	3 40	389 04	382 79	6 25	190	1,102	5,659	32	2,225 00	.....
52	Canfield	160 00	10 00	11 82	231 97	416 79	389 86	26 93	108	703	1,336	5	153 30	156 00
53	Cannington	76 00	75 00	76 50	161 20	388 70	343 99	44 71	218	2,208	2,937	17	1,815 33	55 00
54	Cargill	160 00	8 00	27 50	54 69	250 19	237 64	12 55	110	1,892	2,555	.....	1,263 85	.....
55	Carp	77 00	15 00	47 75	11 17	150 92	138 32	12 60	101	1,214	2,052	.....	700 00	.....
56	Chapleau	125 50	.....	123 65	322 18	571 33	565 06	6 27	107	1,906	1,103	20	1,596 79	245 80
57	Chatsworth	61 25	.....	50 24	11 29	125 78	125 78	.....	101	2,608	1,966	10	1,743 07	12 98
58	Cheapside	58 40	.....	17 00	20 50	95 90	82 94	12 96	101	1,437	850	.....	1,012 38	.....
59	Cheltenham	160 00	.....	51 50	44 64	256 14	250 70	5 44	122	2,586	1,262	.....	2,341 20	.....
60	Claremont	113 30	10 00	37 50	41 19	231 99	231 99	.....	104	2,364	1,610	.....	1,733 19	37 09
61	Clarksburg	27 00	.....	12 25	21 01	60 26	60 26	.....	105	1,040	1,577	.....	950 00	8 81
62	Claude	68 10	.....	25 00	17 11	110 21	109 92	30 29	103	2,785	2,056	.....	1,830 29	.....
63	Cobourg	200 00	100 00	212 50	542 09	1,054 59	946 82	107 77	209	3,676	17,300	10	2,400 00	15 50
64	Colborne	125 00	.....	32 50	28 24	185 74	185 73	01	110	1,721	1,629	.....	1,075 00	118 24
65	Cold Springs	.....	10 00	70 00	140 00	220 00	220 00	.....	125	1,183	915	.....	1,050 00	22 00
66	Coldstream	104 10	10 00	44 25	127 06	285 41	258 80	26 61	127	1,585	3,170	22	812 00	160 00
67	Coldwater	199 45	60 00	62 25	216 40	538 10	505 45	32 65	140	1,836	2,481	19	1,286 16	179 29
68	Comber	200 00	50 00	50 50	29 87	330 37	317 87	13 30	101	1,873	2,652	21	1,225 00	.....
69	Cookstown	160 00	10 00	31 75	153 81	355 56	355 56	.....	105	1,427	7,210	.....	910 00	157 56
70	Crysler	160 00	.....	24 50	40 00	224 50	223 65	85	137	492	47	.....	106 50	209 76
71	Dalhousie (McDonald's Corners P.O.)	75 70	.....	.....	74 32	150 02	148 11	1 91	112	673	749	2	100 00	70 73
72	Dorchester	85 30	.....	36 25	66 53	188 08	150 82	37 26	166	978	1,586	.....	806 02	.....
73	Douglas	73 25	.....	28 75	4 23	106 23	91 98	14 25	115	1,001	2,531	.....	682 81	.....
74	Dresden	160 00	25 00	57 35	156 05	398 40	386 53	11 87	130	1,692	3,622	.....	1,162 53	151 45
75	Dromore	160 00	.....	9 00	158 16	327 16	327 16	.....	159	542	1,691	.....	315 91	117 21
76	Drumbo	157 20	.....	51 00	73 34	281 54	232 42	49 12	101	826	2,536	.....	512 00	.....
77	Dryden	.....	.....	161 55	205 91	367 46	331 86	35 60	140	871	3,031	.....	1,035 00	200 00
78	Duart	160 00	25 00	25 50	108 70	319 20	318 97	23	102	2,501	1,961	.....	1,791 38	60 77
79	Dundalk	158 65	.....	29 10	50 15	237 90	236 00	1 90	102	2,822	2,843	.....	1,800 00	.....
80	Dundas	200 00	300 00	163 00	144 03	807 03	801 99	5 04	242	7,531	6,121	53	6,244 03	.....

81	Dundella	50 00	.....	25 25	29 75	105 00	104 02	98	122	401	853	.....	215 00	29 00
82	Dungannon	94 55	35 00	45 95	109 11	281 61	277 64	6 97	112	1,689	2,347	17	955 00	90 00
83	Dunville	160 00	50 00	63 60	34 87	307 87	282 76	25 11	102	2,850	5,823	.....	1,275 11	74 00
84	Durham	116 40	.....	76 82	104 90	298 12	251 09	47 03	120	3,920	3,551	25	4,050 00	60 00
85	Easton's Corners	35 70	.....	15 50	63 33	114 53	78 90	35 63	106	1,046	1,095	.....	775 09	.....
86	Elgin	.....	.....	131 00	371 87	502 87	502 87	.....	116	581	1,333	2	440 78	225 39
87	Elmira	86 00	.....	50 50	196 38	332 88	332 43	45	121	2,948	2,558	19	2,138 68	159 75
88	Elmvale	159 70	.....	87 90	246 47	494 07	493 15	92	158	1,786	3,084	.....	1,009 83	211 15
89	Elmwood	160 00	.....	18 67	124 06	302 73	291 88	10 85	135	567	1,353	.....	289 55	63 78
90	Elora	115 60	92 60	138 05	230 93	657 18	657 18	.....	176	9,103	7,992	21	8,500 00	183 81
91	Elphin	.....	.....	.....	219 29	219 29	219 29	.....	101	379	10	.....	210 63	210 63
92	Embro	134 20	35 00	75 25	5 95	250 40	244 20	6 20	102	5,131	4,685	15	4,139 11	.....
93	Emsdale	118 20	5 00	20 13	41 03	184 36	183 52	84	106	950	1,314	.....	570 00	180 49
94	Emotville	99 60	25 00	17 15	95 68	237 43	199 38	38 05	178	2,904	1,230	.....	2,380 00	.....
95	Essex	134 30	150 00	69 30	80 48	434 08	422 53	11 55	151	2,755	4,862	27	2,426 87	48 74
96	Ethel	79 20	20 00	19 25	21 63	140 08	135 02	5 06	164	1,452	2,291	.....	965 41	30 94
97	Fenella	36 00	.....	20 00	21 72	80 72	62 40	18 32	104	649	673	.....	292 85	.....
98	Fenelon Falls	136 00	75 00	97 00	226 98	534 98	534 98	.....	143	3,534	3,938	22	2,640 00	167 81
99	Fergus	112 50	75 00	87 85	61 30	336 65	333 56	3 09	126	4,819	4,080	25	5,870 00	.....
100	Finch	160 00	.....	54 00	57 63	271 58	225 78	45 85	122	672	897	.....	469 13	240 00
101	Floradale	59 10	.....	13 00	27 13	129 53	129 53	.....	115	2,107	1,950	.....	1,077 77	25 66
102	Fonthill	115 15	50 00	39 50	59 05	263 70	220 61	43 09	102	2,703	2,109	27	2,506 39	25 00
103	Forester's Falls	.....	.....	71 00	176 00	247 00	227 38	19 62	201	397	478	.....	212 50	170 00
104	Fort Erie	67 85	35 00	32 75	91 79	227 39	224 30	3 09	102	2,779	3,540	.....	1,708 34	54 34
105	Fort Frances	161 80	40 00	56 85	14 85	273 50	272 74	76	104	1,052	2,088	10	1,100 00	6 75
106	Freelton	113 90	.....	25 65	1 49	141 04	130 50	10 54	103	401	872	.....	346 64	14 56
107	Gananoque	161 70	250 00	293 00	114 57	819 27	781 31	37 96	187	3,148	9,682	19	2,430 00	57 50
108	Glammis	.....	40 00	60 50	204 13	304 63	230 37	74 32	121	446	1,040	.....	221 85	5 25
109	Glen Allan	86 85	10 00	27 50	5 53	129 88	122 79	7 09	102	1,101	1,155	.....	856 28	4 69
110	Gleanmorris	102 20	50 00	31 55	15 20	198 95	198 95	.....	100	2,377	1,011	17	1,890 50	10 45
111	Gore's Landing	83 22	.....	39 25	116 83	239 30	212 38	21 92	112	860	934	.....	776 15	93 35
112	Gorrie	62 40	15 00	12 95	21 57	111 92	111 92	.....	162	1,824	2,539	.....	1,477 42	.....
113	Haileybury	29 60	.....	11 00	25 24	65 84	65 33	51	152	330	577	.....	180 91	.....
114	Haliburton	71 10	25 00	26 25	40 19	162 54	143 59	18 95	105	676	1,791	.....	317 00	3 30
115	Hanover	33 15	25 00	32 60	89 87	182 92	172 26	10 66	189	800	2,059	.....	571 89	87 07
116	Harrington	78 80	.....	37 00	7 09	122 89	122 89	.....	76	837	1,628	.....	510 00	3 11
117	Harrow	81 70	50 00	27 55	133 88	293 13	208 66	84 47	110	1,032	2,028	15	458 78	.....
118	Harrowsmith	.....	20 00	105 00	11 03	166 03	166 03	.....	105	237	939	.....	179 03	12 53
119	Havelock	.....	.....	15 00	326 78	341 78	341 78	.....	15	426	.....	.....	305 78	251 49
120	Hawkesville	22 00	.....	16 35	7 18	45 53	28 86	16 67	107	773	707	.....	360 51	.....
121	Hensall	155 30	40 00	66 75	154 39	416 44	409 12	7 32	143	1,310	3,163	.....	974 06	145 51
122	Hepworth	32 55	15 00	18 10	27 32	92 97	92 97	.....	101	983	1,585	.....	589 33	16 35
123	Highgate	160 00	25 00	12 50	36 10	233 60	225 60	8 00	110	1,381	4,618	.....	1,247 00	200 00
124	Highland Creek	.....	.....	22 50	30 29	52 79	52 30	49	125	1,125	1,021	.....	1,200 00	.....
125	Hillsburg	160 00	.....	68 00	50 00	278 00	278 00	.....	112	1,166	2,114	.....	930 00	206 00
126	Hillsdale	.....	.....	121 75	107 08	228 83	228 83	.....	100	500	1,350	.....	216 23	96 86
127	Holstein	160 00	.....	40 00	40 88	240 88	240 88	.....	141	660	1,363	.....	412 00	114 00
128	Honeywood	.....	15 00	62 45	24 64	102 09	101 68	41	102	244	552	.....	113 93	26 58
129	Huntsville	200 00	100 00	77 50	97 13	474 98	474 98	.....	124	2,816	7,312	21	1,960 00	41 18
130	Inkerman	26 00	.....	7 75	.....	33 75	33 26	49	109	157	17	.....	75 00	.....
131	Inwood	.....	.....	116 23	92 70	208 93	196 02	12 91	150	265	1,600	.....	200 30	102 83
132	Islington	70 30	10 00	35 00	7 82	123 12	120 56	2 56	129	1,496	2,338	11	793 00	.....
133	Jarvis	109 15	.....	85 00	43 27	237 72	231 13	6 59	102	3,010	3,031	17	1,050 00	262 07
134	Jasper	.....	.....	13 00	166 00	209 00	209 00	.....	122	409	308	.....	219 00	160 00
135	Kearney	.....	.....	10 00	.....	10 00	10 00	.....	47	306	791	.....	199 00	30 00
136	Kemble	160 00	.....	18 50	202 05	380 55	362 49	18 06	120	915	1,483	.....	616 46	179 46
137	Keswick	.....	.....	26 00	161 74	187 74	187 74	.....	115	266	148	.....	180 89	170 82
138	Kinburn	160 00	.....	39 75	111 85	311 60	310 65	95	120	1,722	1,779	.....	1,177 67	65 00
139	Kincardine	197 30	160 00	93 22	227 69	678 21	677 37	84	188	4,467	11,034	34	3,725 00	500 00
140	King	.....	.....	19 50	100 16	119 66	113 21	6 45	112	1,656	792	.....	916 01	107 03

TABLE A.—Receipts, Expenditure, Assets and Liabilities, etc., of Public Libraries (not Free) for the year ending 31st December, 1902.—*Continued.*

No.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in Library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
141	Kingston	181 00	300 00	352 50	148 82	965 32	964 37	95	350	6,931	19,292	57	6,350 95	193 45
142	Kinmount	160 00	50 00	35 00	124 86	369 86	356 99	12 87	101	1,392	2,991	.....	1,227 88	101 00
143	Kintore	.....	25 00	14 75	7 35	47 10	27 10	20 00	20	683	285	.....	475 00	.....
144	Kirkfield	145 75	50 00	28 00	35 95	259 70	251 16	8 54	105	1,288	1,295	16	970 82	157 42
145	Lake Charles	103 90	.....	25 00	5 16	134 06	134 06	.....	100	2,013	1,504	.....	1,410 82	.....
146	Lefroy	.....	35 00	59 50	105 00	199 50	141 69	54 81	119	307	1,037	.....	187 56	100 00
147	Linwood	.....	.....	27 50	46 50	74 00	74 00	.....	110	809	645	.....	790 00	7 10
148	Lion's Head	.....	25 00	7 50	27 26	59 76	59 76	.....	107	1,202	907	.....	277 46	.....
149	Little Britain	181 70	50 00	22 60	113 33	367 63	367 63	.....	129	1,964	1,744	18	1,574 96	119 16
150	Lorne Park	.....	10 00	50 50	146 93	207 43	207 43	.....	104	168	751	4	306 00	123 56
151	Luem	17 20	50 00	16 35	32 21	115 76	115 76	.....	71	2,338	1,825	.....	1,200 00	32 21
152	Lynden	.....	.....	41 33	47 61	88 94	88 11	83	128	1,318	2,188	.....	709 87	15 00
153	Maberley	.....	.....	41 00	160 00	201 00	200 00	1 00	124	364	172	.....	204 21	168 95
154	Madoc	195 30	.....	70 50	69 01	334 81	331 43	3 38	141	1,222	6,007	.....	837 32	10 50
155	Mallorytown	159 60	.....	20 50	64 47	244 57	244 57	.....	82	1,392	1,825	.....	1,025 44	130 30
156	Manilla	141 40	50 00	21 50	22 50	238 40	235 95	2 45	129	2,325	1,989	1	1,040 29	.....
157	Manitowaning	.....	15 00	38 90	225 31	279 21	279 21	.....	187	1,061	143	.....	810 00	217 00
158	Manotick	19 25	.....	32 50	95	82 70	81 50	1 20	110	1,802	2,702	.....	1,214 91	.....
159	Maple	40 10	25 00	12 75	48 65	126 50	110 29	16 21	104	623	1,116	12	187 23	35 00
160	Maitland	.....	.....	22 50	200 00	222 50	219 32	3 18	101	384	676	.....	210 00	200 00
161	Markham	60 25	.....	65 00	195 44	320 69	320 69	.....	127	2,913	6,470	.....	2,175 00	38 18
162	Marksville	160 00	20 00	22 55	193 36	395 91	380 82	15 09	109	787	1,690	.....	588 90	189 46
163	Matilda (Iroquois P.O.)	47 70	.....	15 25	91 59	157 54	133 96	23 58	166	252	252	.....	137 59	40 00
164	Maxwell and Feversham	160 00	10 00	35 15	136 31	341 46	305 66	35 80	111	710	2,741	.....	423 20	158 91
165	Maxville	.....	.....	43 50	232 52	277 02	247 35	29 67	115	310	1,299	.....	236 02	200 00
166	Menford	153 20	60 00	81 25	167 18	461 63	461 63	.....	128	2,698	3,050	32	1,925 00	.....
167	Melancthon	160 00	.....	7 35	35 07	202 42	172 79	29 63	100	1,099	1,104	.....	715 00	170 00
168	Melbourne	114 55	20 00	28 75	153 38	317 08	302 86	14 22	103	1,082	1,300	12	770 00	165 00
169	Metcalfe	160 00	.....	35 50	67 19	262 69	262 69	.....	198	658	1,861	.....	489 45	245 60
170	Middleville	160 00	.....	28 00	134 55	322 55	321 74	81	174	675	1,652	.....	311 05	132 54
171	Mildmay	132 40	30 00	17 33	73	180 16	153 68	27 08	121	1,878	2,088	.....	1,037 77	164 22
172	Millgrove	25 00	.....	11 50	17 50	54 00	32 19	21 81	100	475	2,104	3	269 49	13 66
173	Milton	83 10	.....	42 50	104 76	230 36	219 37	10 99	122	3,974	4,702	7	4,000 00	.....
174	Minden	106 90	25 00	26 50	13 76	172 16	145 09	27 07	108	896	1,955	3	800 23	.....
175	Mississippi	160 00	.....	15 25	50 19	225 44	225 44	.....	102	1,020	857	.....	657 00	210 23
176	Molesworth	160 00	5 00	13 50	67 50	246 00	199 46	46 54	135	595	1,710	.....	449 45	199 18
177	Monkton	160 00	20 00	25 30	129 01	334 31	334 28	03	106	1,329	2,029	.....	987 44	149 50
178	Mono Road	.....	.....	40 00	.....	40 00	38 50	1 50	80	1,885	2,658	.....	1,225 00	3 68
179	Moose Creek	.....	.....	22 00	200 00	222 60	222 00	.....	105	382	560	.....	200 00	200 00
180	Morrisburg	95 20	75 00	155 50	73 05	398 75	398 75	.....	142	2,482	4,142	26	1,275 00	66 25

181	Morriston	55 90	.....	43 90	8 62	108 42	98 89	9 53	105	1,263	1,910	3	734 67	.....
182	Mount Albert	41 70	.....	22 55	31 32	95 57	95 57	.....	107	868	1,841	.....	635 08	115 19
183	Mount Brydges	159 70	.....	14 00	280 61	454 31	451 31	.....	299	719	2,727	.....	465 58	196 77
184	Mount Forest	114 30	50 00	75 65	81 21	321 16	315 53	5 63	198	2,941	3,628	16	2,982 60	.....
185	Munster	36 70	.....	6 00	6 12	48 82	48 82	.....	76	258	535	.....	163 00	2 96
186	Nanticoke	159 50	.....	14 25	111 38	285 13	271 58	13 55	144	1,939	1,938	.....	1,355 64	76 78
187	Napanee	200 00	200 00	215 75	82 52	698 27	582 27	115 40	200	4,246	11,769	33	5,115 00	.....
188	Newboro'	.....	.....	29 75	200 03	229 78	214 83	14 95	101	315	885	.....	214 98	200 03
189	Newburg	115 75	25 00	40 82	75 93	257 50	249 07	8 43	112	1,975	1,513	21	1,670 00	150 00
190	Newbury	115 30	.....	25 10	101 22	241 92	241 92	.....	110	681	2,395	.....	362 50	77 00
191	New Durham	.....	.....	71 25	206 92	278 17	278 17	.....	103	520	894	.....	265 64	141 00
192	New Hamburg	191 70	50 00	76 76	27 76	346 22	335 31	10 91	149	2,605	4,700	.....	1,864 62	157 57
193	New Dundee	160 00	25 00	15 25	21 82	222 07	212 94	9 13	94	722	1,258	.....	415 15	.....
194	Newmarket	98 25	50 00	42 50	112 15	632 90	632 90	.....	257	2,259	7,042	28	1,902 88	190 01
195	Niagara	99 15	.....	146 51	56 92	302 58	302 58	.....	106	5,754	8,704	27	5,100 00	1 33
196	Niagara Falls	200 00	500 00	95 75	25 99	821 74	764 70	57 04	383	5,562	9,567	26	6,900 00	.....
197	Norland	.....	.....	29 00	211 00	240 00	240 00	.....	115	314	24	.....	220 00	240 00
198	North Gower	75 70	.....	46 75	36 96	159 41	155 41	4 00	130	1,796	2,837	.....	990 00	.....
199	Norwich	187 00	50 00	106 00	108 87	451 87	345 35	106 52	127	1,643	3,601	21	1,090 00	.....
200	Norwood	181 60	25 00	85 70	187 48	479 78	455 97	23 81	199	2,099	6,484	16	1,239 39	203 33
201	Oakville	91 50	95 00	31 75	65 00	283 25	283 25	.....	134	3,425	2,873	.....	2,895 00	34 40
202	Oakwood	97 75	50 00	27 25	244 15	419 15	419 15	.....	125	1,425	2,237	26	922 41	104 06
203	Odessa	105 75	.....	36 95	169 52	312 22	312 22	.....	202	935	2,251	13	626 18	97 07
204	Omemee	40 00	100 00	55 00	174 71	369 71	369 71	.....	107	1,181	2,735	25	955 24	107 04
205	Ophir	40 60	.....	49 20	1 10	90 90	80 80	10 90	106	289	371	.....	177 00	.....
206	Orillia	156 40	231 00	247 00	19 64	654 04	628 08	25 96	163	4,127	8,568	20	4,093 00	240 00
207	Orono	62 05	.....	32 20	73 29	167 54	109 34	58 20	80	1,191	1,351	.....	1,222 02	116 00
208	Owen Sound	146 00	.....	211 60	50 78	408 38	392 98	15 40	211	4,857	10,363	21	5,000 00	.....
209	Oxford Mills	63 00	.....	18 00	15 55	96 55	96 55	.....	102	1,248	5,265	.....	1,012 22	49 22
210	Pakenham	17 00	15 00	20 80	27 52	80 32	80 27	05	105	533	1,210	.....	387 80	45 72
211	Paris	126 00	150 00	184 00	56 76	516 76	485 98	30 78	184	6,887	5,233	39	11,517 51	.....
212	Pelee Island	.....	.....	28 20	4 30	32 50	18 29	14 21	115	289	64	.....	250 00	.....
213	Perth	119 75	100 00	110 15	76 03	406 03	405 87	16	101	4,159	2,883	13	2,100 00	179 00
214	Peterborough	200 00	.....	454 65	458 29	1,112 94	1,060 92	52 02	370	9,803	14,888	84	11,528 33	101 60
215	Petrolea	.....	.....	222 25	258 32	480 57	445 57	35 00	208	770	2,702	.....	525 04	298 47
216	Pickering	53 20	40 00	38 25	69 11	200 56	173 00	27 46	100	1,740	1,117	17	1,225 00	25 00
217	Pinkerton	160 00	20 00	25 75	42 64	248 39	234 82	13 57	103	1,385	1,341	5	925 01	175 29
218	Plattsville	42 50	.....	32 05	46 44	120 99	66 73	54 26	137	1,061	1,957	.....	578 56	.....
219	Point Edward	160 00	50 00	14 80	75 13	299 93	293 89	6 04	107	3,587	3,327	.....	3,725 29	.....
220	Poland	.....	.....	20 00	200 00	200 00	203 25	16 75	101	274	109	.....	210 00	200 00
221	Port Arthur	200 00	430 00	103 00	98 25	831 25	787 95	43 30	137	2,099	3,690	23	2,673 56	238 40
222	Port Burwell	150 40	.....	48 25	38 86	237 51	237 51	.....	110	790	1,046	.....	413 74	.....
223	Port Credit	65 40	20 90	30 00	75 01	190 41	158 55	31 86	113	1,557	1,519	.....	970 98	50 00
224	Port Dover	193 60	.....	72 82	10 38	276 80	239 69	37 11	115	824	2,180	18	625 00	.....
225	Port Elgin	122 22	20 00	29 75	2 04	174 01	168 81	5 20	119	3,052	1,067	17	1,885 20	.....
226	Port Hope	146 00	.....	309 75	399 30	855 05	715 43	139 62	210	4,102	6,39 9	12	4,569 18	.....
227	Port Perry	128 00	105 00	162 15	141 82	536 97	527 66	9 31	172	1,989	1,514	22	1,575 00	92 82
228	Port Stanley	73 20	.....	38 25	4 01	115 46	115 30	16	106	1,170	1,170	.....	880 00	.....
229	Powassen	160 00	.....	48 47	51 68	260 15	258 55	1 60	116	888	1,931	.....	647 55	197 40
230	Princeton	160 00	.....	45 02	92 90	297 92	285 74	12 18	118	1,641	3,002	.....	1,041 05	29 80
231	Queensville	49 10	.....	19 25	1 47	69 82	68 25	1 57	110	1,961	2,557	.....	1,281 04	55 00
232	Rat Portage	200 00	250 00	190 25	577 54	1,217 79	1,210 74	7 05	142	2,631	5,300	31	2,077 10	176 06
233	Richmond	88 15	.....	41 50	16 14	145 79	141 19	4 60	103	1,326	1,609	.....	963 15	.....
234	Ridgetown	161 10	60 00	125 50	267 48	614 08	605 92	8 16	217	3,680	5,269	30	4,775 00	.....
235	Ripley	93 20	45 00	36 75	345 61	520 56	511 46	9 10	174	1,657	3,766	.....	1,345 70	202 48
236	Riversdale	104 10	15 00	7 00	3 90	130 00	114 88	15 12	105	892	1,215	.....	626 35	.....
237	Rockwood	100 25	.....	44 80	77 47	222 52	212 83	9 69	103	1,135	2,520	13	584 17	.....
238	Rodney	160 00	15 00	26 23	7 95	209 18	194 28	14 90	126	1,081	1,638	12	1,009 80	140 26
239	Romney	120 80	40 00	30 90	17 63	209 33	196 64	12 69	103	2,325	1,734	.....	1,771 79	30 60
	Rosemont	156 25	.....	16 25	.....	172 50	170 50	2 00	104	1,217	1,243	.....	840 19	.....

TABLE A.—Receipts, Expenditure, Assets and Liabilities, etc., of Public Libraries (not Free) for the year ending 31st December, 1902.—*Concluded.*

No.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in Library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
241	Rosseau	40 75	.....	30 10	54 65	122 50	122 50	.....	104	555	1,053	.....	270 42	37 75
242	Russell	130 00	.....	62 60	586 17	778 77	687 83	90 94	130	1,661	3,542	26	2,550 00	385 42
243	Saltfleet (Stoney Creek P.O.)	160 00	50 00	26 00	209 00	445 00	429 70	15 30	104	697	1,320	.....	627 00	180 00
244	Scarboro	160 00	.....	90 00	27 84	277 84	277 76	08	130	5,356	3,845	.....	3,875 00	.....
245	Schreiber	92 00	.....	244 00	860 10	1,246 10	725 01	521 09	125	1,565	3,710	14	2,762 52	300 00
246	Scotland	129 55	.....	54 50	119 06	302 91	231 98	70 93	130	1,185	1,777	25	795 86	.....
247	Severn Bridge	.....	.....	35 00	200 00	237 00	217 91	19 09	103	108	915	.....	210 86	200 00
248	Shakespeare	160 00	.....	34 50	213 55	408 05	400 98	7 07	136	1,570	3,491	.....	1,013 70	100 00
249	Shallow Lake	160 00	.....	176 26	39 68	372 94	370 21	2 73	113	1,061	2,183	.....	617 15	113 00
250	Sheldon	82 10	.....	57 90	116 43	256 43	243 65	12 78	105	1,229	2,155	.....	653 78	121 30
251	Smithville	160 00	25 00	93 50	66 78	345 28	308 29	41 99	169	613	3,531	.....	460 30	171 64
252	Southampton	94 65	10 00	82 01	99 38	286 04	162 09	123 95	128	1,320	2,872	.....	3,272 11	.....
253	South River	96 10	5 00	45 15	93 60	241 15	203 29	37 86	103	970	1,921	.....	1,175 42	.....
254	Sparta	63 60	.....	42 90	107 27	213 77	193 20	20 57	111	2,308	2,747	.....	1,779 98	.....
255	Spencerville	41 60	.....	11 90	37 69	91 19	.....	.....	115	528	1,012	.....	300 00	71 72
256	Strathroy	200 00	75 00	163 00	537 17	975 17	840 39	164 78	280	5,855	19,321	25	5,425 00	65 00
257	St. George	139 70	50 00	24 65	185 69	399 44	380 50	11 94	106	5,062	2,333	14	5,814 06	.....
258	St. Helen's	160 00	35 00	22 25	67 54	224 79	207 30	17 49	105	1,616	1,442	23	1,366 83	119 04
259	Sunderland	158 60	55 00	13 00	128 60	356 20	242 81	93 39	111	1,716	1,196	12	1,274 00	.....
260	Sunnidale	132 50	.....	11 28	2 51	146 29	143 57	2 72	108	770	831	.....	167 04	110 60
261	Tavistock	195 15	.....	83 25	200 61	479 01	373 04	105 97	111	3,147	3,645	24	1,685 91	.....
262	Teeswater	151 55	50 00	74 89	115 29	391 73	313 41	88 32	161	3,648	2,677	23	2,225 00	.....
263	Thamesford	75 10	25 00	65 67	72 64	236 36	202 65	33 71	129	1,755	2,620	16	1,293 28	.....
264	Thamesville	173 10	150 00	114 00	386 16	823 86	791 53	32 33	124	3,502	4,197	22	3,022 25	297 98
265	Thedford	134 10	.....	81 80	27 76	243 66	193 20	18 46	105	1,962	4,633	.....	1,065 00	.....
266	Thornbury	10 00	25 00	11 75	58 52	138 27	86 90	51 37	131	1,061	2,237	.....	380 00	.....
267	Thornloe	93 30	.....	10 15	103 54	239 29	239 29	.....	163	662	2,266	.....	108 43	96 62
268	Thornton	.....	40 00	41 25	206 20	287 45	250 79	36 66	205	127	1,143	.....	287 45	203 29
269	Tilbury	166 25	60 00	61 35	248 39	535 99	535 99	.....	110	1,981	2,762	22	1,136 78	235 09
270	Tillsonburg	154 25	100 00	115 03	143 64	512 89	505 20	7 69	125	2,611	6,021	20	1,900 00	100 00
271	Tiverton	95 15	15 00	26 00	49 08	185 53	182 85	2 68	101	1,884	1,673	.....	1,320 00	99 23
272	Toronto Junction	164 00	300 00	135 00	90 81	690 11	655 10	35 31	172	3,338	5,873	31	2,650 00	.....
273	Trout Creek	160 00	.....	19 35	64 76	244 11	244 11	.....	200	1,159	912	.....	974 90	181 33
274	Underwood	98 30	30 00	27 75	31 55	190 60	145 90	44 70	138	2,500	2,792	.....	1,098 00	.....
275	Unionville	79 10	.....	26 11	33 30	138 51	120 03	18 45	103	510	1,968	.....	358 00	.....
276	Vandorf	64 30	.....	17 50	87 18	198 98	180 48	18 50	103	2,215	976	.....	1,690 00	43 36
277	Vankleek Hill	147 30	.....	90 75	63 89	301 04	302 52	1 52	132	975	3,324	2	821 51	.....
278	Vars	127 20	.....	32 75	232 51	382 16	310 49	11 97	151	990	1,938	.....	739 58	.....
279	Victoria	80 00	.....	25 50	28 27	133 77	130 24	3 53	102	2,354	1,713	.....	1,669 00	.....
280	Victoria Mines	.....	.....	100 00	29 39	129 39	101 85	27 54	105	138	33	7	95 94	27 70

281	Vienna			26 25	173 75	200 00	200 20		105	153			221 00	200 00	
282	Violet Hill	59 25		3 30	9 30	71 85	69 10	2 75	33	816	300		620 00		
283	Wales	160 00		58 50	9 80	228 30	228 30		111	1,018	2,799		630 08	218 90	
284	Walkerton	183 60	20 00	118 25	40 85	362 70	348 61	14 09	146	2,909	5,053	20	1,920 69	94 15	
285	Walton	160 00	20 00	25 00	64 47	269 47	250 74	18 73	122	923	3,136		413 40	185 92	
286	Wardsville	33 70	30 00	10 25	74 65	148 60	141 36	7 24	111	1,402	1,414		950 70	59 74	
287	Warkworth	81 40	35 00	50 10	110 23	276 73	263 69	13 04	102	1,075	802	19	688 25	147 38	
288	Waterdown	71 30	25 00	32 00	52 80	181 10	178 61	2 49	156	2,094	2,984		902 50	102 15	
289	Watson's Corners			22 00	182 50	204 50	204 50		116	323	268		230 39	200 00	
290	Webbwood			29 00	200 00	229 00	293 00	6 00	110	471	229		600 00	200 06	
291	Welland	154 10	100 00	76 00	85 29	415 39	351 07	64 32	214	3,809	6,041	35	4,346 01		
292	Wellesley	156 70		31 10	106 96	295 06	283 16	11 90	134	1,247	2,816		830 22	50 00	
293	West Lorne	69 50	15 00	20 00	36 94	141 44	134 08	7 36	276	1,091	1,697	25	838 44	143 24	
294	Westport			42 50	200 00	242 50	209 15	33 35	141	269	100		233 35	200 00	
295	Weston	124 95	50 00	62 00	110 98	347 93	347 01	92	126	3,262	4,238	28	2,450 00	111 25	
296	Wheatley	84 25	75 00	36 95	71 25	267 45	264 07	3 38	105	1,610	2,920	14	1,125 00	55 10	
297	Whitby	100 15	75 00	66 35	170 07	411 57	403 90	7 67	102	3,157	6,410		2,060 00	154 58	
298	White Lake	41 85			25 72	67 57	63 18	4 39	116	669	785		271 11		
299	Williamstown	65 20	35 00	90 25	10 86	201 31	198 17	3 14	160	1,332	1,522		1,289 82	10 00	
300	Wolfe Island			82 50	200 00	282 50	222 18	60 32	102	347	638		220 00	282 32	
301	Woodbridge	75 20		23 00	145 11	243 31	166 89	76 42	106	1,801	1,662	15	1,600 00		
302	Woodstock	200 00	125 00	419 97	76 83	821 80	791 52	30 28	297	5,733	11,999	33	3,800 06	194 71	
303	Woodville	95 50	75 00	36 00	30 56	237 06	237 06		109	2,284	1,789	25	1,512 00		
304	Yarker			97 50	202 83	300 33	282 72	17 61	140	523	2,244	15	241 33	217 83	
305	York	83 15	15 00	24 50	49 62	172 57	172 57		174	351	2,430		529 48	44 62	
306	Zephyr	132 90		15 85	61 42	210 17	206 43	3 74	132	1,317	1,608		857 91	151 81	
	Total	29,959 19	9,754 60	17,852 35	33,213 41	90,809 55	85,150 23	5,659 32	40,875	535,528	855,669	2,375	426,103 88	28,458 33	

II. PUBLIC LIBRARIES, FREE.

The following extracts are taken from the Annual Reports for the year ending 31st December, 1902, (for details see table B.)

1. Classification of Free Libraries Reporting.

Free Libraries, with reading rooms	92
Free Libraries, without reading rooms	48
Total	140

2. Free Libraries, Receipts and Balances on Hand.

The total receipts of 140 Free Libraries was	$155,505 74
Balances on hand	12,416 65

3. Free Libraries, Expenditure.

The total expenditure of 140 Free Libraries was	$143,089 09

4. Free Libraries, Assets and Liabilities.

Assets of 140 Free Libraries	$725,773 16
Liabilities of 140 Free Libraries	116,469 82

5. Number of Readers in Free Libraries.

140 Free Libraries report having had 131,917 readers.

6. No. of Volumes in Free Libraries, and No. of Volumes Issued.

Number of volumes in 140 Free Libraries	604,864
Number of volumes issued in 140 Free Libraries	1,882,921

7. Reading Rooms in Free Libraries.

92 Free Libraries reported having reading rooms.
2 Free Libraries reported having periodicals' for circulation.
94 Free Libraries subscribed for 3,669 newspapers and periodicals.

TABLE B.—Receipts, Expenditure, Assets and Liabilities, etc., of Public Libraries (Free) for the year ending 31st Dec., 1902.

No.	Free Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of readers.	Number of volumes in Library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
1	Acton	157 00	100 00	.....	43 41	300 41	275 00	25 41	205	1,984	3 382	.....	2,052 53	190 69
2	Ailsa Craig	73 90	100 00	3 15	120 86	297 91	195 56	102 35	140	2,211	3,621	.....	1,950 00	.....
3	Algonquin	119 00	.....	25 00	188 98	332 98	331 09	1 89	135	1,714	1,358	.....	1,109 23	188 23
4	Alton	108 60	.....	15 65	51 60	175 85	174 29	1 56	194	5,270	3,393	.....	4,556 01	.....
5	Alvinston	56 80	.....	50 00	48 05	154 85	146 02	8 83	102	2,258	2,073	26	1,731 00	183 38
6	Arnprior	130 60	100 00	.....	102 53	333 13	309 38	23 75	340	2,372	4,478	.....	1,473 75	29 18
7	Aylmer	200 00	297 10	17 00	52 79	566 89	558 08	8 81	433	3,857	8,260	29	3 425 00	37 05
8	Ayrd	101 00	135 00	.....	83 84	319 84	319 43	41	325	3,262	6,039	31	1,760 00	25 00
9	Beeton	102 70	255 00	.....	121 69	479 39	479 22	17	131	2,583	4,568	10	1,350 00	70 50
10	Berlin	200 00	1,647 72	.....	295 16	2,142 88	2,142 88	.....	915	8,445	16,731	57	8,301 21	271 03
11	Bloomsburg	22 50	.....	.....	22 00	44 50	42 90	1 60	102	143	97	.....	49 05	29 90
12	Bothwell	108 40	100 00	.....	130 65	339 05	267 74	71 31	277	1,961	4,066	.....	1,334 00	159 04
13	Bracebridge	124 30	450 00	33 69	106 47	714 46	614 58	99 88	463	2,666	7,453	23	1,655 61	.....
14	Brampton	200 00	340 00	.....	170 45	710 45	709 22	1 23	456	4,116	13,459	21	2,750 00	.....
15	Brantford	200 00	2,400 00	13 00	673 20	3,286 20	3,286 20	.....	2,531	18,339	69,116	89	15,745 00	.....
16	Brighton	196 70	192 56	.....	8 64	397 90	381 09	16 81	275	2,826	5,371	23	1,316 81	194 69
17	Brockville	200 00	1,100 00	18 25	208 45	1,526 70	1,454 21	72 49	2,103	9,986	40,426	53	9,150 00	78 76
18	Brussells	197 20	100 00	43 00	50 04	390 24	389 09	1 15	284	2,903	5,246	25	1,626 35	87 00
19	Burk's Falls	200 00	175 00	.....	34 48	409 48	388 59	20 89	360	2,029	3,723	12	1,415 00	.....
20	Caledon	160 00	.....	.....	220 46	380 46	380 46	.....	106	3,352	1,286	.....	2,596 16	173 43
21	Caledonia	140 30	85 00	.....	34 91	260 21	255 00	5 21	215	2,503	4,968	.....	1,105 65	.....
22	Camden, East	101 50	55 00	.....	28 00	184 50	184 50	.....	238	1,707	1,930	16	947 67	102 49
23	Cardinal	123 00	150 00	1 00	247 40	521 40	445 34	76 06	209	4,837	3,697	26	1,220 00	125 00
24	Carleton Place	199 60	300 00	.....	249 69	749 29	482 62	266 67	167	4,172	13,501	17	2,940 03	.....
25	Cayuga	135 70	65 00	24 90	3 07	228 67	223 61	5 06	134	1,736	2,269	.....	1,067 00	64 73
26	Chatham	200 00	1,078 53	.....	1,997 15	3,275 68	2,798 68	477 00	742	6,140	17,764	58	5,477 00	.....
27	Chesley	122 50	180 60	17 00	160 71	480 84	451 16	29 68	336	1,722	6,552	24	850 00	.....
28	Chesterville	143 20	50 00	.....	233 15	426 35	275 76	150 59	374	1,266	4,688	.....	1,039 37	.....
29	Clifford	112 90	100 00	15 60	65 38	293 88	293 88	.....	211	3,515	2,122	.....	1,650 37	65 37
30	Clinton	200 00	165 00	.....	423 01	788 01	663 91	124 10	577	4,126	12,277	36	13,351 82	.....
31	Colden	105 80	45 00	.....	210 82	361 62	271 91	89 71	107	639	1,911	.....	466 02	151 18
32	Collingwood	151 20	781 05	.....	2,168 19	3,100 74	3,097 26	3 48	896	5,059	13,028	37	7,355 51	.....
33	Copleston	160 60	20 00	11 40	22 72	214 12	214 12	.....	121	1,242	1,878	.....	800 00	.....
34	Cornwall	200 00	500 00	.....	261 49	961 49	961 49	.....	710	3,566	13,806	31	2,500 05	712 74
35	Creemore	73 30	25 00	3 50	4 75	106 55	98 41	8 14	127	1,170	1,569	.....	560 00	.....
36	Deseronto	200 00	600 00	.....	544 16	1,344 16	1,324 30	19 86	937	3,767	36,150	60	3,108 55	40 09
37	Delhi	80 00	225 00	.....	97 76	402 76	373 60	29 16	191	1,615	3,647	21	1,180 33	.....
38	Don	68 80	25 00	.....	21 82	115 62	115 62	.....	43	1,077	712	.....	711 97	.....
39	Drayton	297 90	150 00	.....	178 25	626 15	626 15	.....	273	3,373	3,058	15	2,200 00	77 71
40	Dutton	156 00	50 00	34 94	.....	240 94	240 41	53	198	1,706	2,343	.....	1,520 40	191 29
41	Erin	68 90	35 00	.....	13 09	116 99	111 65	5 34	249	1,998	3,271	.....	1,348 33	.....
42	Exeter	149 40	179 31	38 60	38 56	405 87	373 84	32 03	483	4,291	9,655	22	2,439 00	.....

TABLE B.—Receipts, Expenditure, Assets and Liabilities, etc., of Public Libraries (Free) for the year ending 31st Dec., 1902.—*Con.*

No.	Free Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of readers.	Number of volumes in Library.	Number of Volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balance and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
43	Fordwich	35 00	15 00	12 75	202 84	265 16	265 16	.....	125	1,808	1,353	.....	1,159 65	186 99
44	Forest	179 45	200 00	.....	203 86	583 31	550 75	32 56	502	3,710	7,442	19	3,107 56	150 00
45	Galt	200 00	1,130 00	.....	85 39	1,715 39	1,675 96	39 43	1,800	5,347	34,102	42	7,000 00	.....
46	Garden Island	167 30	100 00	53 19	354 63	675 12	675 12	.....	130	5,621	1,640	32	3,343 11	.....
47	Georgetown	177 30	200 00	.....	113 10	491 30	441 45	49 85	290	2,702	7,778	28	2,240 00	.....
48	Glencoe	149 32	51 00	.....	75 42	276 74	276 74	.....	269	2,313	3,885	.....	1,010 00	.....
49	Goderich	170 00	315 00	61 50	256 84	803 34	626 60	176 74	600	4,205	11,767	33	1,600 00	.....
50	Gore Bay	.....	100 00	8 40	113 16	251 56	251 56	.....	245	1,709	18,777	.....	1,200 00	108 35
51	Grand Valley	151 45	70 00	.....	157 78	382 23	382 23	.....	185	2,392	3,111	11	1,531 64	125 33
52	Grantham (St. Catharines P.O.)	160 00	50 00	.....	121 21	351 21	332 33	23 88	150	1,950	2,177	.....	1,335 25	84 00
53	Gravenhurst	34 00	100 00	.....	202 28	336 28	336 28	.....	563	2,915	6,326	.....	1,272 07	226 81
54	Grimsby	161 30	315 00	1 00	18 40	198 70	187 88	10 82	700	4,269	15,511	23	3,200 00	.....
55	Guelph	200 00	1,150 00	.....	111 31	1,764 31	1,761 31	.....	1,202	11,090	57,170	48	11,200 00	.....
56	Hagersville	161 60	100 00	20 00	32 41	319 66	313 50	6 16	536	2,043	5,952	19	1,507 39	161 37
57	Hamilton	200 00	13,250 00	129 35	2,180 93	16,060 28	16,060 28	.....	13,200	23,848	107,407	192	68,664 47	28,166 16
58	Harriston	131 00	286 25	7 70	84 77	189 17	277 91	11 26	607	4,138	5,511	30	2,150 00	.....
59	Hespeler	191 75	200 00	1 00	150 75	543 50	111 25	99 25	472	3,317	10,201	24	2,650 00	.....
60	Holyrood	76 25	30 00	.....	123 97	230 22	210 05	20 17	100	2,085	1,328	.....	1,870 68	103 95
61	Ingersoll	165 50	530 00	.....	52 08	747 58	746 98	60	1,050	4,111	20,103	25	2,100 00	12 23
62	Iroquois	170 30	150 00	.....	123 10	393 40	389 69	3 71	193	1,831	5,670	21	1,939 61	175 00
63	Kemptville	182 10	190 00	.....	198 91	581 01	526 13	54 88	359	1,363	8,103	16	1,055 18	200 91
64	Kingsville	158 80	300 00	.....	162 00	600 80	436 72	164 14	261	1,532	4,510	24	1,374 14	50 00
65	Lakefield	70 00	100 00	1 00	28 21	199 21	188 82	10 39	1,601	1,152	2,251	18	625 00	.....
66	Lanark	178 90	91 00	.....	12 54	315 44	303 81	11 63	295	1,611	4,181	16	1,163 08	69 73
67	Lancaster	160 00	80 00	3 75	2,463 65	2,847 40	1,024 83	1,822 57	246	3,189	3,073	3	2,225 00	.....
68	Leamington	143 80	100 00	.....	153 05	397 85	383 15	14 70	285	2,158	3,608	24	1,440 00	.....
69	Lindsay	200 00	843 19	.....	118 54	1,162 93	919 32	243 61	1,101	3,860	18,156	51	1,058 61	129 24
70	Listowel	199 00	100 00	31 88	200 22	531 10	532 35	1 75	558	3,049	8,121	20	2,000 00	200 00
71	Little Current	68 00	57 00	.....	.....	125 00	125 00	.....	275	1,122	3,133	.....	905 00	.....
72	London	200 00	8,703 14	.....	2,751 76	11,654 90	11,353 24	301 66	2,000	16,572	70,183	135	12,000 00	22,917 18
73	Lucknow	160 00	100 00	43 45	18 25	326 70	324 72	1 98	316	3,130	4,410	.....	1,650 00	.....
74	Markdale	191 20	135 80	2 50	29 89	362 39	349 53	12 86	186	2,724	3,142	20	2,671 36	.....
75	Marlbank	.....	.....	.....	248 45	248 45	239 78	8 67	168	569	779	12	391 00	.....
76	Merrickville	150 70	125 00	11 45	312 18	599 63	567 19	32 14	299	2,712	4,643	.....	2,157 50	272 20
77	Merritton	120 90	100 00	.....	39 61	260 51	232 95	27 56	460	1,862	3,922	.....	1,183 22	.....
78	Midland	168 60	250 00	.....	60 38	478 98	467 29	11 69	585	2,474	14,386	25	900 00	198 25
79	Millbrook	155 25	125 00	.....	135 72	415 97	337 84	78 13	308	1,951	7,108	29	1,350 00	300 00
80	Milverton	160 00	50 00	2 00	268 02	486 07	417 90	68 17	201	2,030	3,260	.....	1,539 22	195 18
81	Mitchell	197 20	555 00	13 75	21 06	197 61	125 66	71 95	221	3,925	8,379	22	4,833 09	.....
82	Nairn Centre	37 25	.....	.....	108 05	145 30	133 30	12 00	300	597	779	.....	272 45	107 23
83	Napanee Mills	125 30	.....	.....	115 54	240 84	240 84	.....	130	1,315	1,554	.....	705 00	174 76
84	Newington	155 80	.....	2 10	200 17	358 72	352 38	6 34	115	508	364	13	1,647 93	197 23

85	Niagara Falls South	70 00	90 00	6 50	11 14	177 64	161 90	15 74	227	2,331	3,863	.....	1,485 00	27 25
86	North Bay	96 10	125 01	.....	14 10	235 20	211 48	23 72	280	1,966	4,010	17	1,766 64	.....
87	Oil Springs	98 50	132 61	.....	39 19	270 30	270 30	.....	223	1,859	3,630	.....	1,450 00	.....
88	Orangeville	192 00	324 00	30 55	81 07	627 62	566 17	61 15	491	3,540	7,694	29	3,425 00	250 00
89	Oshawa	159 20	558 18	.....	575 34	1,292 72	1,149 87	142 85	815	3,504	13,617	46	2,010 00	550 00
90	Otterville	97 50	25 10	.....	237 19	359 79	338 27	21 52	220	866	2,703	.....	641 97	140 99
91	Paisley	95 70	212 00	20 80	42 42	370 92	355 72	15 20	300	4,200	6,157	23	2,650 00	.....
92	Palmerston	164 40	80 00	35 65	87 83	367 88	367 72	16	291	2,021	7,576	29	1,701 64	687 46
93	Parkhill	106 70	50 00	.....	34 45	191 15	171 63	19 52	389	2,093	3,911	.....	1,218 42	106 95
94	Parry Sound	186 75	250 00	.....	31 80	468 55	468 55	.....	350	1,817	13,400	20	1,375 00	365 20
95	Pembroke	198 15	494 09	.....	90 53	882 77	853 63	29 14	549	1,937	7,937	24	1,050 00	188 14
96	Penetanguishene	172 55	390 77	.....	.....	563 32	563 32	.....	368	4,884	8,937	9	2,679 00	.....
97	Picton	164 80	568 22	2 00	164 78	899 80	899 80	.....	1,072	2,718	13,678	22	1,600 00	155 78
98	Port Carling	78 50	64 85	8 95	108 99	261 29	253 86	7 43	135	1,521	1,140	12	656 00	115 42
99	Port Colborne	143 50	70 00	21 68	79 62	314 80	289 41	25 39	235	2,018	1,373	1	1,638 61	74 89
100	Port Rowan	147 50	60 00	.....	268 29	475 79	466 06	9 73	333	2,174	3,915	.....	2,283 81	250 00
101	Prescott	200 00	250 00	.....	109 23	559 23	554 37	4 86	813	4,732	11,486	21	5,350 00	.....
102	Preston	139 80	250 00	.....	125 38	515 18	409 68	105 50	289	6,085	6,198	29	6,440 00	.....
103	Renfrew	126 80	300 00	.....	7 37	434 17	370 39	63 78	295	3,653	9,025	14	3,585 67	122 75
104	Richmond Hill	123 50	80 00	3 50	58 99	265 99	244 16	21 83	180	2,966	3,129	28	1,950 00	.....
105	Ridgeway	81 40	30 00	.....	68 98	180 38	151 91	28 47	136	1,172	2,787	.....	864 86	.....
106	Sarnia	200 00	1,344 82	.....	6,253 19	7,798 01	4,022 46	3,775 55	851	3,735	23,877	43	9,840 95	.....
107	Sault Ste. Marie	200 00	171 95	118 25	93 22	583 42	564 57	18 85	671	2,272	10,098	20	900 00	.....
108	Seaforth	162 30	325 48	11 70	140 63	640 11	581 72	58 39	392	4,708	11,846	15	4,458 49	806 00
109	Shelburne	188 40	75 00	8 10	22 06	293 56	293 56	.....	212	2,518	5,000	21	2,042 27	26 46
110	Simcoe	200 00	477 72	.....	552 39	1,230 11	902 81	327 30	589	5,117	12,342	50	7,327 30	.....
111	Smith's Falls	198 60	450 00	5 00	339 30	992 90	968 31	24 59	682	4,671	14,107	26	2,285 00	197 50
112	Springfield	183 80	50 00	11 75	22 21	267 76	222 80	44 96	136	1,777	959	.....	1,475 04	398 81
113	Sprucedale	126 40	85 00	13 10	85	225 35	224 62	73	110	878	827	.....	495 00	100 00
114	Stayner	39 00	77 00	4 00	20 33	140 33	127 70	12 63	234	1,569	3,899	.....	1,065 75	.....
115	Stouffville	126 35	165 00	.....	154 39	445 74	412 84	32 90	274	3,910	7,122	29	4,233 00	75 00
116	Stratford	200 00	800 00	9 00	555 61	1,564 61	1,366 63	197 98	500	6,616	39,904	44	5,197 98	.....
117	Streetsville	131 60	100 00	17 98	178 15	427 73	413 39	14 34	155	2,621	3,408	20	3,100 00	507 27
118	St. Catharines	200 00	2,000 00	8 00	252 39	2,460 39	2,206 43	253 96	1,993	8,258	39,885	45	7,582 84	.....
119	St. Mary's	160 25	250 00	.....	410 89	821 14	761 39	59 75	650	1,463	13,263	22	2,559 00	300 00
120	St. Thomas	200 00	900 00	.....	527 50	1,627 50	1,493 31	134 19	1,377	7,717	21,638	48	5,150 00	.....
121	Sundridge	77 90	113 60	.....	.....	191 50	191 50	.....	119	1,021	1,340	16	657 00	.....
122	Tamworth	.....	60 00	.....	93 60	153 60	113 78	39 82	100	1,355	485	.....	389 78	149 19
123	Tara	67 50	85 00	19 55	40 26	212 31	211 35	96	172	1,958	3,430	16	1,995 77	.....
124	Thessalon	160 00	200 00	.....	16 20	376 20	370 93	5 27	146	1,985	2,230	17	1,185 21	215 00
125	Thornhill	19 20	40 00	.....	106 81	166 01	166 01	.....	176	813	1,001	10	547 77	106 14
126	Thorold	194 00	325 00	.....	74 12	593 12	513 72	79 40	914	5,130	9,840	20	5,280 00	82 17
127	Toronto	200 00	33,112 00	.....	2,155 94	35,477 94	35,463 24	14 70	55,404	128,557	529,780	791	256,273 21	51,996 65
128	Tottenham	78 90	.....	.....	121 74	200 64	200 64	.....	121	2,429	2,063	.....	1,310 95	37 44
129	Trenton	160 00	250 00	30 00	5 00	445 00	438 21	6 79	586	2,474	9,550	75	4,882 56	161 79
130	Uxbridge	172 80	225 00	32 00	108 53	538 33	538 33	.....	1,059	6,312	8,512	28	9,650 00	83 53
131	Wallaceburg	184 15	259 48	.....	218 36	661 99	436 70	225 29	430	1,925	8,301	20	1,448 93	.....
132	Waterford	63 05	29 29	19 92	4 91	117 17	117 17	.....	163	1,403	2,257	.....	925 00	175 00
133	Waterloo	189 50	350 00	.....	71 30	610 80	586 05	24 75	540	7,241	9,497	35	5,957 02	.....
134	Watford	172 55	150 00	50 23	8 45	381 23	377 44	3 79	207	2,619	4,626	18	1,600 00	200 00
135	Westford	83 00	15 00	.....	9 39	107 39	91 20	16 19	138	1,346	690	.....	1,126 11	.....
136	Wiarton	200 00	150 00	20 10	400 95	771 05	740 24	30 81	407	3,390	4,777	21	2,577 52	254 73
137	Windsor	200 00	2,936 86	.....	2,598 67	5,735 53	4,780 05	955 48	1,285	10,796	52,934	59	10,708 15	.....
138	Wingham	180 10	325 00	76 78	37 16	619 04	594 23	24 81	401	3,495	9,760	52	2,340 00	.....
139	Wroxeter	140 90	55 00	4 50	28 64	229 04	228 56	48	145	4,246	2,056	.....	4,170 22	.....
140	Wyoming	43 55	60 00	15 40	92 38	211 33	208 01	3 32	105	1,573	1,423	.....	1,000 00	.....
	Total	19,890 77	93,604 27	1,697 79	40,312 91	155,505 74	143,089 09	12,416 65	131,917	604,861	1,882,921	3,669	725,773 16	116,469 82

PROPORTIONATE NUMBER OF VOLUMES IN PUBLIC LIBRARIES.

Libraries With Less Than 250 Volumes.

Bloomsburg, Harrowsmith, Honeywood, Inkerman, Victoria Mines.—5.

Libraries With Over 250 and Less Than 500 Volumes.

Abingdon, Addison, Battersea, Bunyan, Burritt's Rapids, Caistorville, Crysler, Elphin, Forester's Falls, Freelton, Glammis, Haileybury, Havelock, Inwood, Jasper, Kearney, Keswick, Lefroy, Lorne Park, Maberly, Maitland, Matilda, Maxville, Millgrove, Moose Creek, Munster, Newboro', Norland, Ophir, Pelee Island, Poland, Severn Bridge, Thornton, Vienna, Watson's Corners, Webbwood, Westport, Wolfe Island.—38.

Libraries With Over 500 and Less Than 1,000 Volumes.

Allan's Mills, Ancaster, Angus, Badjeros, Bayham, Beachville, Berwick, Brigden, Brucefield, Bruce Mines, Burnstown, Cambray, Canfield, Cobden, Dalhousie, Don, Dorchester, Dromore, Drumbo, Dryden, Dundalk, Elgin, Elmwood, Emsdale, Fenella, Finch, Gore's Landing, Haliburton, Hanover, Harrington, Hawkesville, Hepworth, Hillsdale, Holstein, Kemble, Kintore, Linwood, Maple, Marksville, Marlbank, Maxwell and Feversham, Metcalfe, Middleville, Minden, Molesworth, Mount Albert, Mount Brydges, Nairn Centre, Newbury, New Durham, New Dundee, Newington, Odessa, Otterville, Pakenham, Petrolea, Port Burwell, Port Dover, Powassan, Riversdale, Rosseau, Saltfleet, Smithville, South River, Spencerville, Sprucedale, Sunnidale, Thornhill, Thornloe, Unionville, Vankleek Hill, Vars, Violet Hill, Walton, White Lake, Yarker, York.—77.

Libraries With Over 1,000 and Less Than 1,500 Volumes.

Admaston, Alma, Auburn, Avonmore, Beaverton, Belwood, Bervie, Blyth, Bracondale, Bridgeburg, Carp, Cheapside, Chesterville, Clarksburg, Colborne, Cold Springs, Cookstown, Copleston, Creemore, Douglas, Easton's Corners, Ethel, Fort Frances, Glen Allan, Harrow, Hensall, Highgate, Highland Creek, Hillsburg, Islington, Kemptville, Kinmount, Kirkfield, Lakefield, Lion's Head, Little Current, Lynden, Madoc, Mallorytown, Manitowaning, Melancthon, Melbourne, Mississippi, Monkton, Morriston, Napanee Mills, Oakwood, Omemee, Orono, Oxford Mills, Pinkerton, Plattsville, Port Stanley, Richmond, Ridgeway, Rockwood, Rodney, Rosemont, Scotland, Shallow Lake, Shedden, Stayner, Sundridge, Tamworth, Thornbury, Trout Creek, Wales, Wardsville, Warkworth, Waterford, Wellesley, Westford, West Lorne, Williamstown, Zephyr.—75.

Libraries With Over 1,500 and Less Than 2,00 Volumes.

Acton, Algonquin, Alliston, Atwood, Bloomfield, Bothwell, Brooklin, Burford, Camden East, Cargill, Cayuga, Chapleau, Chesley, Claremont, Coldstream, Coldwater, Comber, Delhi, Dresden, Dungannon, Dutton, Elmvale, Erin, Fordwich, Gore Bay, Gorrie, Grantham, Iroquois, Kinburn, King, Kingsville, Lanark, Little Britain, Manotick, Merritton, Mildmay, Mill-

brook, Mono Road, Nanitcoke, Newburgh, North Bay, North Gower, Norwich, Oil Springs, Parry Sound, Pembroke, Pickering, Port Carling, Port Credit, Port Perry, Princeton, Queensville, Ripley, Russell, Schreiber, Shakespeare, Springfield, St. Helen's, Sunderland, Tara, Thessalon, Thamesford, Thedford, Tilbury, Tiverton, Wallaceburg, Wheatley, Woodbridge, Wyoming.—69.

Libraries With Over 2,000 and Less Than 2,500 Volumes.

Ailsa Craig, Arkona, Arnprior, Beamsville, Belfountain, Bobcaygeon, Bradford, Burk's Falls, Burlington, Cannington, Floradale, Glencoe, Glenmorris, Grand Valley, Hagersville, Holyrood, Leamington, Lake Charles, Lucan, Manilla, Midland, Milverton, Morrisburgh, Newmarket, Niagara Falls S., Norwood, Palmerston, Parkhill, Port Arthur, Port Colborne, Port Rowan, Romney, Sault Ste. Marie, Sparta, Tottenham, Vandori, Victoria Waterdown, Woodville.—39.

Libraries With Over 2,500 and Less Than 3,000 Volumes.

Amherstburg, Arthur, Aurora, Baden, Beeton, Bolton, Bracebridge, Brighton, Brussels, Caledonia, Chatsworth, Cheltenham, Claude, Duart, Dundalk, Dunnville, Elmira, Ennotville, Essex, Fonthill, Fort Erie, Georgetown, Gravenhurst, Huntsville, Markdale, Markham, Meaford, Merrickville, Mount Forest, New Hamburg, Picton, Rat Portage, Richmond Hill, Shelburne, Streetsville, Tillsonburg, Underwood, Walkerton, Watford.—39.

Libraries With Over 3,000 and Less Than 3,500 Volumes.

Aberarder, Almonte, Alvinston, Ayr, Bowmanville, Caledon, Drayton, Gananoque, Hespeler, Jarvis, Lancaster, Listowel, Lucknow, Oakville, Port Elgin, Tavistock, Toronto Junction, Weston, Whitby, Wiarton, Wingham.—21.

Libraries With Over 3,500 and Less Than 4,000 Volumes.

Aylmer, Blenheim, Clifford, Cobourg, Cornwall, Deseronto, Durham, Fenelon Falls, Forest, Lindsay, Milton, Mitchell, Orangeville, Oshawa, Point Edward, Renfrew, Ridgetown, Sarnia, Stouffville, Teeswater, Thamesville, Welland.—22.

Libraries With Over 4,000 and Less Than 5,000 Volumes.

Barrie, Brampton, Belleville, Campbellford, Cardinal, Carleton Place, Clinton, Embro, Exeter, Fergus, Goderich, Grimsby, Harriston, Ingersoll, Kincardine, Napanee, Orillia, Owen Sound, Paisley, Penetanguishene, Perth, Port Hope, Prescott, Seaforth, Smith's Falls, Southampton, St. Mary's Wroxeter.—28.

Libraries With Over 5,000 and Less Than 6,000 Volumes.

Alton, Collingwood, Galt, Garden Island, Niagara, Niagara Falls, Scarboro', Simcoe, Strathroy, St. George, Thorold, Woodstock.—12.

Libraries With Over 6,000 and Less Than 8,000 Volumes.

Dundas, Kingston, Paris, Preston, Stratford, St. Thomas, Uxbridge, Waterloo.—8.

Libraries With Over 8,000 and Less Than 10,000 Volumes.

Berlin, Brockville, Elora, Peterboro', St. Catharines, St. Thomas.—6

Libraries With Over 10,000 and Less Than 20,000 Volumes.

Brantford, Guelph, London, Windsor.—4.

Library With Over 20,000 and Less Than 30,000 Volumes.

Hamilton.—1.

Library With Over 100,000 Volumes.

Toronto.—1.

III. ART SCHOOLS AND DEPARTMENTAL DRAWING EXAMINATIONS.

Tables C. to G show the number of Certificates awarded from the commencement of this branch of the Education Department—1882 to 1903.

TABLE C.—Certificates awarded in Primary Art Courses from 1882 to 1903.

Year.							
1882							
1883							
1884			139	138			756
1885		529	301	168		122	1,532
1886						77	2,608
1887	643	1,204					2,944
1888	805	882					2,979
1889	1,009	961	394		491	187	3,508
1890	1,000	1,009	290	811	313		3,553
1891	1,085	1,569	292	716			4,278
1892	1,361	1,419	569	1,120	720	338	5,527
1893	1,769	1,277		876	392	220	4,973
1894	1,383	719	548	550		153	3,915
1895	1,813	1,429	658	1,311	991	341	6,543
1896		569	361	1,110	1,121		4,621
1897	716	500	212	704	516	111	2,762
1898	851	311	173	1,124	601	149	3,315
1899	1,062	465	168		1,170	160	4,153
1900	1,000	254	194		1,007		3 260
1901	1,366	87	59	695	431		
1902	823		111	599	287		
1903	1,036		91	774			
Total	20,026	14,542	6,171	14,577			68 992

TABLE D.—Certificates awarded in Advanced Art Course from 1883 to 1903.

Year.	Shading (from Cast).	Outline (from Model).	Shading (from Model).	Design (from Flat).	Modelling (from Cast).	Design (from Model).	Art Needlework.	Total.
1883								40
1884			12	12				
1885		18	35	29				
1886		24	19	48				
1887		27	28	25	34			
1888		17	39	44	20			
1889			58	21	25			
1890		76	43					
1891		67	66					
1892		32	72					
1893		54	62					
1894		44	58	79				304
1895		52	78	58	29			284
1896		74		113		29	17	396
1897			126	95				388
1898		73	169	187			18	558
1899		69	152	160		57	22	521
1900		55	82	119			17	384
1901		37	133				13	426
1902		34	74	70			10	290
1903	26	30	10	49			3	190
Total	1,012	815	1,487	1,455	327	396	261	5,753

TABLE E.—Certificates awarded in Industrial Art Course from 1885 to 1903.

Year.	Modelling in clay.	Wood carving.	Wood engraving	Lithography.	Painting on china	Total.
1885	14	.....	.....	.....	.....	14
1886	11	7	.....	.....	.....	18
1887	8	2	.....	.....	.....	10
1888	10	3	1	1	9	24
1889	7	1	3	2	6	19
1890	7	4	.....	1	6	18
1891	5	2	1	.....	7	15
1892	2	1	.....	1	3	7
1893	5	2	.....	1	3	11
1894	4	2	.....	2	10	18
1895	5	3	2	6	18	34
1896	3	2	.....	3	30	38
1897	5	3	1	4	17	30
1898	7	5	.....	1	17	30
1899	9	14	.....	2	17	42
1900	17	14	.....	6	6	43
1901	9	12	.....	2	8	31
1902	6	9	.....	4	12	31
1903	5	11	1	2	5	24
Total	139	97	9	38	174	457

TABLE F.—Certificates awarded in Mechanical Drawing Course from 1883 to 1903.

Year.	Advanced geometry.	Machine drawing.	Building construction.	Industrial design.	Architectural design.	Advanced perspective.	Teachers' certificates.	Total
1883	2	3	1	.....	.....	3	.....	11
1884	1	1	1	.....	.....	1	.....	5
1885	12	32	4	23	.....	12	4	89
1886	14	13	5	23	.....	14	3	77
1887	6	5	12	17	.....	6	3	49
1888	8	7	7	15	.....	11	1	50
1889	13	23	11	26	.....	12	3	82
1890	11	23	3	7	.....	12	2	61
1891	3	31	2	31	.....	28	1	103
1892	17	29	13	27	.....	15	2	110
1893	14	33	10	37	.....	35	1	149
1894	12	17	4	30	.....	9	3	137
1895	5	15	3	31	.....	12	1	82
1896	7	9	1	.....	5	12	1	45
1897	16	13	4	.....	5	15	.....	54
1898	6	14	3	.....	11	8	.....	42
1899	25	20	3	.....	11	18	.....	77
1900	14	7	3	.....	5	14	.....	53
1901	8	14	7	.....	4	15	1	71
1902	18	15	7	.....	7	10	.....	57
1903	23	7	3	.....	7	17	.....	65
Total	248	347	123	354	78	284	36	1,467

TABLE G.—Certificates awarded for Extra Subjects from 1885 to 1903.

Year.	Drawing from the antique.	Shading from casts.	Architectural designs.	Drawing from life.	Painting from life.	Painting oil colors.	Painting water colors.	Sepia.	Monochrome.	Pastel.	Sculpture in marble.	Photogravure.	Repousse work.	Industrial design.	Pen and ink.	Machine drawing.	Engraving on copper	Crayon portraits.	Total.
1885						9	7												16
1886						12	7												19
1887				7		32	9						2						50
1888				15	12	25	14	13	1		2		2						84
1889				12	8	16	21	3	2										62
1890				7	4	28	18	10	4										71
1891				4	5	29	26	3	6										73
1892				2	6	21	16	7	1									2	55
1893	11		2	5	9	35	21	7	4										94
1894	11		2	8	6	29	16	5	7					10		1			95
1895	26		6	14	4	39	24	10	1					17		5	1		147
1896	14			12	6	34	38	6	1	2		1		13	1	1			129
1897	19	11	1	17	6	38	42	7	3	3		3		22	3	4			179
1898	22	12		12	9	37	28	7	6	6	1	6		15	4	6			171
1899	19	14		17	2	10	22	8	1	4		3		31	13	5			149
1900	29	30		13	4	17	10	12	5	5		3		14	14	4			156
1901	25	17		9	1	11	18	14	4	4		4		13	16	6			142
1902	22	16		13	1	19	28	17	2					17	12	4			151
1903	28	12		22	7	13	15	8	4	4				13	16	6			148
Total	226	112	11	189	90	454	380	137	52	28	3	20	4	165	75	42	1	2	1,991

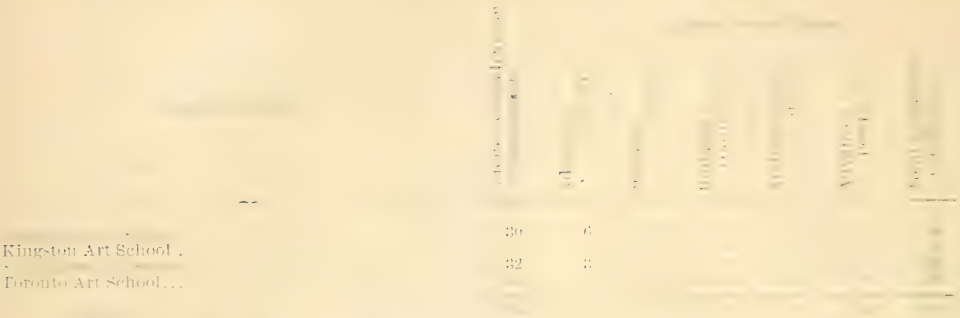
TABLE H.—Certificates awarded to Art Schools, 1903.—Primary Course.

Name of School.	Number of students for examination.	Number of certificates.							Number of teachers' certificates.
		Freehand.	Geometry.	Perspective.	Model.	Blackboard.	Total proficiency certificates.	
Hamilton Art School	88	29	7	5	32	21	91	3
Kingston Art School	13	4	3		5	4	16	
St. Thomas Art School	38	1		1	3	3	8	
Toronto Art School	33	18	6	6	18	15	63	5
Total	172	52	16	12	58	43	181	8

TABLE I.—Certificates awarded to Art Schools, 1903.—Advanced Course.

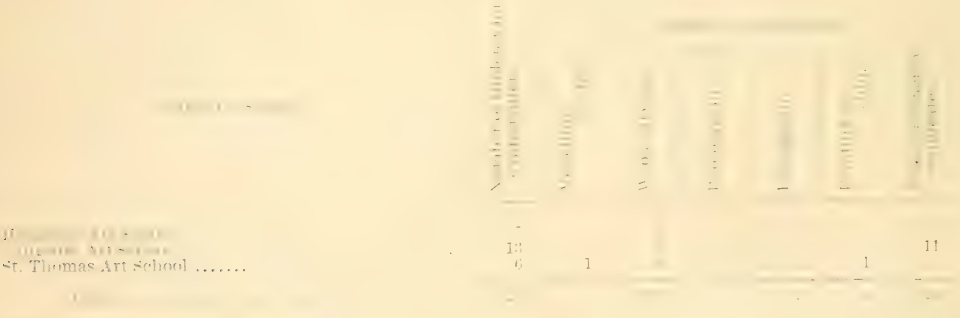
Name of School.	Number of students for examination.	Number of certificates.						
		Shading from flat.	Outline from relief.	Shading from round.	Drawing from flowers.	Industrial design.	Total proficiency certificates.	Number of teachers' certificates.
Hamilton Art School	87	10	8	12	25	10	65	1
Kingston Art School	8	1	1	2	4	2	10	
St. Thomas Art School	18		2	1		2	5	
Toronto Art School	56	9	12	13	9	13	56	1
Total	169	20	23	28	36	27	136	2

TABLE J.—Certificates awarded to Art Schools, 1903.—Mechanical Course.



Kingston Art School	30	6							
Toronto Art School	32	3							

TABLE K.—Certificates awarded to Art Schools, 1903.—Industrial Art Course.



[illegible]									
[illegible]	13								11
St. Thomas Art School	6	1					1		

TABLE L.—Certificates awarded to Art Schools, 1903.—Extra Subjects.

Hamilton Art School									10						1		11			
	11		1				1							11		74				

TABLE M.—Certificates awarded to Public and High Schools, Ladies' Colleges, etc., 1903.—Primary Course.

Name of school.	Number of students for examination.	Freehand drawing.	Geometry.	Perspective.	Model drawing.	Blackboard drawing.	Total proficiency certificates.	Number of teachers' certificates.
Alexandria High School	1							
Almonte High School	34	16			12	7	35	
Arthur High School	34	12			4	5	21	
Athens High School	95	43	45	9	27	23	147	10
Athens Model School	18	13			4	4	21	
Aurora High School	42	30			22	14	66	
Belleville Albert College	13	5	2		6	8	21	
Brantford Public School	54	38			18	8	64	
Brockville Collegiate Institute	70	26	5	3	9	10	53	
Chatham Central School	58	32			22	28	82	
Chatham McKeough P. S.	71	21			18	8	47	
Clinton Collegiate Institute	33	10			10	7	27	
Cobourg Collegiate Institute	1					1	1	
Collingwood Collegiate Institute	66	12	15	6	12	19	64	
Deseronto High School	48	28	19		10	5	62	
Forest High School	21	4	1		5	4	14	
Guelph Public School	1			1	1	1	3	
Hamilton Barton St. Pub. S.	58	20			17	7	44	
Hamilton Cannon St. Pub. S.	71	21			33	11	65	
Hamilton Caroline St. Pub. S.	82	22			20	8	50	
Hamilton Central Pub. S.	69	26			26	6	58	
Hamilton Collegiate Institute	46	24			19	16	59	
Hamilton Hess St. Pub. S.	88	36			18	8	62	
Hamilton Murray St. Pub. S.	18	16			13	7	36	
Hamilton Picton St. Pub. S.	30	13			14	1	28	
Hamilton Queen Victoria and Stinson St. Pub. S.	135	51	20	19	40	13	143	1
Hamilton Ryerson Pub. S.	103	36	22	19	33	23	133	12
Hamilton Sophia St. Pub. S.	41	10			7	2	19	
Hamilton Victoria School	60	17			12	7	36	
Hamilton Wentworth St. P. S.	39	18			15	6	39	
Hamilton West Avenue P. S.	41	10			10	3	23	
Harriston High School	25	4			4	6	14	
Markham High School	63	18	6	2	7	9	12	1
Public School	22	1			1	2	7	
Morrisburgh Collegiate Institute	31	10	5	2	19	6	43	1
Napanee Collegiate Institute	47				29	11	40	
Newmarket High School	19	16	6	2	6	3	32	
Oshawa High School	63	36			19	7	62	1
Owen Sound Collegiate Institute	109	50	17	3	23	29	122	1
Paisley Public School	43	29	17	3	6	3	17	
Picton High School	9		4	3	1	1	9	2
Port Dover High School	15	10	1		3	5	20	
Richmond Hill High School	37	14	2		4	2	23	
Ridgetown Collegiate Institute	1		1			1	2	
Seaforth Collegiate Institute	31	12	1	1	9	7	33	
Smith's Falls	2	2	2		2	2	8	
Streetsville High School	14	9			3	3	21	
Stratford Collegiate Institute	1					1	1	
St. Thomas Alma College	8	4	3	3	6	1	16	
Thorold High School	1		1				1	
Toronto, Harbord St. Coll. Inst.	119	66			40	10	116	
Toronto, Jarvis St. Coll. Inst.	11	7	2		8	3	25	
Toronto, Palmerston Ave. P.S.	30	4			11	12	27	
Uxbridge High School	8	5	1		15	14	6	
Watford High School	1	1	1		1	1	3	1
Windsor Collegiate Institute	126	60		2	42	30	166	
Total	2,151	984	232	79	716	18	2,494	30

TABLE N.—Certificates awarded to High Schools, Ladies' Colleges, etc., 1903.—Advanced Course.

Name of School.	Number of students for examination.	Number of certificates.						
		Shading from flat.	Outline from round.	Shading from round.	Drawing from flowers	Industrial designs.	Total proficiency certificates.	Number of teachers' certificates.
Belleville Albert College	8	3	1	3	3	3	15	
Chatham Central School	1					1	1	
Forest High School	2					2	2	
Markham High School	21					1	1	
St. Thomas Alma College	1		1			1	2	
Toronto Palmerston Ave. P.S.	30			2	5	1	8	
Windsor Collegiate Institute	22	1	5	7	5	6	24	1
Total	92	6	7	12	13	15	53	1

TABLE O.—Certificates awarded to High Schools, etc., 1903.—Mechanical Course.

Name of School.	Number of students for examination.	Number of certificates,						Number of teachers' certificates.
		Advanced Geometry.	Machine drawing.	Building construction.	Architectural design.	Advanced perspective.	Total proficiency certificates.	
Alexandria High School	1							
Cayuga High School	1							
Cobourg High School	1					1	1	
Chatham Central School	1		1	1			2	
Guelph Collegiate Institute	1	1				1	2	
Markham High School	3	1				2	3	
Morrisburg Collegiate Institute	1	1				1	2	
Napanee Collegiate Institute	1	1					1	
Port Hope High School	1	1					1	
Ridgetown College Institute	1	1					1	
Smith's Falls High School	2	1					1	
Sarnia Collegiate Institute	1	1				1	2	
Stratford Collegiate Institute	1	1				1	2	
Uxbridge High School	2							
Watford High School	1							
Windsor Collegiate Institute	6							
Total	25	9	1	1		7	18	

TABLE P.—Certificates awarded to Ladies' Colleges, etc., 1903.—Extra Subjects.

Name of School.	Number of students for examination.	Number of certificate. Painting oil colors.	Painting water colors.	Industrial design.	Total.
Belleville Albert College	9	2	3	1	6
Toronto Loretto Abbey	13	1	2	.....	3
*Toronto Miss Coventry's School	1	1	.....	.....	1
Whitby, Miss Montgomery's School	2	.....	1	.....	1
Total	25	4	6	1	11

* A student from Miss Coventry's School also passed in china painting.

TEACHERS' FULL CERTIFICATES.

The following full certificates in the Primary and Advanced Courses were awarded in 1903.

1. Teachers' Full Certificates—Primary Course.

Name.	Address.	Name.	Address.
Males.		*Females.*	
*Baird, Wm.	Toronto.	Bishop, Olive	Athens.
Bishop, C. P	Athens.	Board, Olive	Hamilton.
Brison, D. G	Watford.	Clarke, Kathleen	Picton.
Broder, Henry	Morrisburg.	Clayton, V.	Toronto.
Green, Raymond	Athens.	Cooper, Grace	Toronto.
*Handcock, Herbert	Hamilton.	Dean, Edith	Hamilton.
Hay, Wm. G	Owen Sound.	Grose, F. E	Oshawa.
Hill, R. J	Hamilton.	*Ireland, Marguerite	Hamilton.
*Hood, Findlay	Toronto.	Kennedy, Ruth	Hamilton.
*Hughes, Frank J	Hamilton.	Kerr, Grace	Hamilton.
Jones, Erie	Athens.	*McKenzie, Alice	Hamilton.
Kennedy, W. T	Hamilton.	McLaughlin, Edna	Athens.
Leggett, Charles	Athens.	Odell, Annie	Hamilton.
Murphy, A. A.	Athens.	*Patterson, Ruby	Hamilton.
Robertson, John	Hamilton.	Stockwell, Florence	Hamilton.
Singleton, Omer	Athens.	Twiss, Fannie A	Hamilton.
Stinson, John N	Athens.		
*Stockdale, T. N	Toronto.		
Stuart, Wm.	Hamilton.		
Tackaberry, S. F	Athens.		
Toffey, Lester	Athens.		
Walters, C.	Picton.		

*Honors.

2. Teachers' Full Certificates.—Advanced Course.

Name.	Address.	Name.	Address.
Males.		*Females.*	
Clemens, Lewis	Toronto.	Cameron, Nellie	Hamilton.
		Patillo, Lillie	Windsor.

Examination Papers.

The total number of examination papers sent out in 1903 was as follows:

Primary Course.

Freehand	2,267	
Geometry	1,001	
Perspective	815	
Model Drawing	2,364	
Blackboard Drawing	2,283	
		8,730

Advanced Course.

Shading, flat	147	
Outline, round	173	
Shading, round	192	
Flower Drawing	225	
Industrial Design	143	
		880

Mechanical Course.

Advanced Geometry	72	
Machine Drawing	54	
Building Construction	35	
Architectural Design	31	
Advanced Perspective	62	
	259	
Total		9,869

ART SCHOOLS.

Report for the year ending 30th April, 1903.

Only four Art Schools were in operation this year, viz.: Hamilton, Kingston, St. Thomas, and Toronto.

The decrease of Art Schools may be chiefly attributed to the increased interest taken in Drawing, etc., in Public and High Schools, and Ladies' Colleges; qualified teachers are now employed in these Schools, and their pupils are more successful in passing the curriculum of studies in the minor branches than Art School pupils, who frequently are allowed to study so many different subjects that many fail in their examinations.

1. Hamilton Art School.

During this year the Hamilton Art School has been re-organized. A new Board of Directors has been elected, and a new staff of teachers appointed. The Directors omitted sending Annual Report for 1902-3, but their report of daily and evening attendance for the year shows that lessons in nineteen out of the twenty prescribed subjects, also in several extra subjects, including oil and water color painting, were given. The report shows that the students in attendance represented the following trades and professions, viz.: Accountants, architects, apprentices, bookkeepers, clerks, draughtsmen, engravers, farmers, lithographers, machinists, mantle-makers, metal-workers, painters, pattern-makers, photographers, stenographers, students, tailors, teachers, weavers and wood-workers.

The receipts, including Government grant, were $1,931.38; expenditure, $2,686.83; overdraft, $755.45.

2. Kingston Art School.

The report of Kingston Art School shows that 40 pupils, 15 years of age and over, took lessons in the Primary, Advanced, Mechanical, and Industrial Art Courses, and Oil and Water Color Painting.

The trades and professions represented in the evening classes were as follows: Architects, Carpenters, Cheesemakers, Clerks, Electricians, Engineers, Iron and Wood Workers, Machinists, and Shipwrights.

The receipts,, including Government grant, were $574.45, expenditure $574.45.

3. St. Thomas Art School.

The report of St. Thomas Art School shows that 66 pupils, 15 years of age and over, took lessons in the prescribed subjects in the Primary, Advanced, Mechanical, and Industrial Art Courses, and Oil and Water Color Painting.

The following trades and professions were represented: Apprentices, Boilermakers, Clerks, Carpenters, Draughtsmen, Engineers, Laborers, Milliner, Painters, Students, Teachers.

As this School is incorporated with St. Thomas Public Library, the receipts and expenditure are entered on the Annual Report of the Public Library for 1902.

4. Toronto Art School.

The report of the Toronto Art School shows that the total number of names on the roll was 194, average daily attendance 100, aggregate attendance 9,650.

The following trades and occupations have been represented: Artists, Architect Students, China Painters, Clerks, Crayon Artists, Carpenters, Designers, Enamel Painters, Engravers, Glass Grainers, Harness Makers, Illustrators, Journalists, Lithographers, Milliners, Nurse, Painters, Piano Finishers, Pattern Makers, Plumber, Photographer, Reproducers, Sign Writers, School Teachers, Stenographers, Students, Wood Carvers.

The Royal Canadian Academy Life Class has been held two evenings per week during the winter.

Students who had attended any of the classes of the School during the session of 1901-2 were allowed to hold a drawing class for practice two evenings per week during the summer months.

The recipts, including Government grant, were $3,491.67, expenditure $3,379.85, cash on hand $111.82, total $3,491.67. Liabilities $772.84.

5. Ontario Society of Artists.

The report of the Ontario Society of Artists shows that 184 works, comprising Paintings in Oil and Water Colors, Pastels, Sculpture, Modelling in Clay, etc., were exhibited at their 30th Annual Exhibition.

The following pictures were purchased for the Provincial Art Galley:
1* Pictures selected by the Ontario Society of Artists:
An Upland Pasture, ($100.00), F. H. Bridgen.
Flax Workers, ($100.00), O. P. Staples.
2** Pictures selected by a committee of the Civic Art Guild:
Stream by the Woods, ($50.00), W. E. Atkinson.
Evening on the Seine, Paris, ($100.00), J. W. Beatty.
Study for Mural Decoration, ($100.00), F. S. Challener.
Deep Sea Fishers, ($180.00), R. F. Gagen.
Flower Market, Paris, ($40.00), C. S. Hagarty.
Stormbound, ($30.00), J. D. Kelly.
Summer Reverie, ($100.00), G. A. Reid.
Afternoon Sunlight, ($75.00), Mary H. Reid.
A Half Holiday, ($80.00), O. P. Staples.
The Last Load, (45.00), S. B. Tully.

The Provincial Art Gallery was re-hung, making a total of 118 pictures upon the walls of the Canadian room.

The Fine Arts Department at the Industrial Exhibition was arranged by the Society. 222 works by professional Artists were exhibited in two of the large rooms; two small rooms were devoted to amateur work; the remaining large room, and the central hall were filled with Art and Technical School and professional decorative work, including painting on China.

This was the first Exhibition held in the new Art Gallery erected on the Exhibition grounds.

The Exhibition Association paid $1,000.00 to the Society, and purchased pictures to the value of $500.00 from those exhibited in the new Art Gallery.

The Society sent a small collection of Oil and Water Colors to Winnipeg for exhibition, but it was not a financial success.

The annual prize $200.00 for the best exhibited work of the year is continued, and is open to all exhibitors without distinction.

The Art School pays the Society $350.00 per annum for rent of rooms.

The Architecture Eighteen Club pays $80.00 per annum rent.

The Evening Life Class in connection with the Royal Canadian Academy is granted free room to carry on its work.

The receipts, including Government grant, were $4,492.90, expenditure $2,518.41, balance on hand $1,974.49, total $4,492.90.

LITERARY AND SCIENTIFIC INSTITUTIONS.

1. Hamilton Scientific Association.

The Report of the Hamilton Scientific Association shows that they have 187 members.

Sixteen meetings, including the Inaugural Address, were held, at which the following papers were read and discussed:

Inaugural address, with remarks on recent advances made in chemical and physical sciences. The President, J. M. Dickson. Wireless Tele-

*In 1895 the Act made provision that two pictures of the value of $200 should be paid for out of each annual grant to the Ontario Society of Artists, said pictures to become the property of the Provincial Art Gallery.

**In 1897 the Minister of Education entered into an agreement with the Ontario Society of Artists that if the Society would keep one of the large galleries in the Education Museum filled with the most recent works of its members, pictures to the value of $800 would be purchased annually for the Provincial Art Gallery.

graphy, Dr. Merchant. Placer Mining, C. E. Murton. The Mackenzie River District, J. W. Tyrell. Education versus Educational Themes, S. A. Morgan. A Trip to the Holy Land, Messrs. Aitcheson and Moodie Kelvin's Theory of Ether as Applied to Stellar Universe, J. R. Collins. The Moon, G. P. Jenkins. Determining the Length of Light Waves, C. A. Chant. The Planet Jupiter, Rev. R. E. Brady. Determination of Time, and the Transit Instrument, F. L. Blake. Looking Up and Looking Down, J. M. Williams. The Planet Saturn, Wm. Bruce. Astronomy in Navigation, Capt. Hardy. Adam's Home, Rev. D. B. Marsh. Is the Moon an Extinct World? Mr. Maybee.

These meetings were largely attended, not only by the members, but by the public of the city.

The Photographic section still continues its active work; on 24th May the Club held an outing at the Forks of the Credit. During the year the members divided into four groups for friendly competition. The annual competition and exhibition took place in March, and was very successful.

The Astronomical section is also very successful. The meetings of the branch have been so largely attended that it is proposed to provide more seating accommodation, which can be done by having upright glass cases for the specimens in the museum, thus affording more floor space as recommended by the Superintendent of Public Libraries, etc.

The Geological section has continued its good work in the collection and distribution of fossi's. During the year acknowledgments of contributions have been received from the Directors of the British Museum of Natural History; also from Professor J. F. Whitheaves, Geological Survey, Ottawa, and J. M. Clarke, State Palaeontologist, for the New York Museum.

The Museum was kept open to the public every Saturday afternoon.

The receipts were $657.56, expenditure $537.21, balance on hand $120.35.

2. Ottawa Literary and Scientific Society.

Ottawa Literary and Scientific Society shows that there are 278 members. The Library, which is open daily, has been very successful. The issue of books and bound magazines during the year was 6,109, and current magazines 1,638. The Library now contains 4,743 books, in addition to pamphlets and unbound publications received as exchanges. The Reading Room, which is supplied with all the leading periodicals and papers, is opened daily, and well attended by the members.

The annual course of lectures comprised the following subjects:

A Study of the Man from Glengarry, O. J. Jolliffe. Purification of Drinking Water, A. McGill. Original Poems, W. W. Campbell. Primitive Poetry, a Compartive Study, W. W. Edgar. The Development of the Canadian Type of Character, Rev. S. G. Bland. Social Settlements, illustrated, W. L. M. King. The Development of Responsible Government in Canada, W. D. Le Sueur. The Poetry of Matthew Arnold, Benjamin Russell. The French Treaty Shore, Prof. J. C. Bracy.

The Transactions of the Society, consisting of 97 pages, were published and distributed to a large number of Societies and Public Institutions, and many valuable publications were received in exchange.

Receipts, including Government grant, $991.04, expenditure $973.29, balance on hand $17.75.

(3) L'Institut Canadien Francaise d'Ottawa.

The Fifty-first Annual Report of the Institut Canadien d'Ottawa shows that conversational classes were held during four months of the year. The difficulties of daily life, with other subjects, were discussed and resulted in inducing an increased interest in the Reading Room and Library. These classes, which may be considered the same as evening classes, cost the Society $126.30.

The following public lectures were given: Impressions de Voyage, Globe-trotter parisien, Joseph Gerard. Boxeurs vs. Chretuns, Charles Tilgat. La Renaissance, Germain Martin. Une Reception, l'Acadimie Francaise, Rev. S. Corteil. Emparons nons de l'Industrie, Errol Bouchette. Emile Zola, Rev. Pere Lejeune. Etat actuel de la Litterature Canadienne Francaise, Jules Lesage. Portraits Litteraires de Quartre de nos Hommies d'etat Canadiens Francaise, Henry Desjardins. La Bonne diction francaise, comment l'aequerir et la conserver, Joseph Dumais. La loi sur les Congregations Religieuses en France, M. le Baron St. Elme de Champ. Les Causes Celibres, Napoleon Champagne. La Bretagne Heroique, Theodore Botrel.

Some of the lecturers resided at long distances from Ottawa, and their engagements caused considerable expense to the Society.

In addition to these lectures a series of twenty lectures on the French literature of the seventeenth century were given by the Rev. Father Louis Lejenue.

The Reading Room was so largely patronized that an additional sum of $55.00 was expended for magazines, making the total expenditure for periodicals, etc., $175.00.

The Society has done excellent work during the past year, but, owing to increase of rent, etc., has not sufficient income to pay off all outstanding debts.

Receipts, including Government grant, $1,420.00, expenditure $2,071.73. Actual deficit $651.73.

(4) St. Patrick's Literary and Scientific Association of Ottawa.

The report of the St. Patrick's Literary and Scientific Association, Ottawa, shows that they had 250 members, with a Library containing 1,547 volumes. They expended $177.00 for books, and $60.65 for Reading Room. They now occupy an excellent building, which cost over $30,000.00, and have no liabilities.

During the year they received $650.00 members' fees, and realized $5,256.50 from concerts and entertainments.

Receipts, including Government grant $6,160.65, expenditure $5,869.15, balance on hand $291.50.

(5) Ottawa Field Naturalists' Club.

The Report of the Ottawa Naturalists' Club shows that the membership of the Club is 262.

The President, Mr. W. F. Macoun, represented the Club at the meeting of the Royal Society of Canada, held in Toronto in May, and read a report on the work done in the Club during the year.

Soirees: Seven Soirees were held during the winter. The lectures were as follows: President's Address. The Functions of a Geological Survey, Dr. Bell. Address of Welcome, The Principal of the Normal School. Some Butterflies and Moths, Dr. Fletcher. Conversazione, with Exhibitions of

Natural History and Microscopic Study. The Rocky Mountain Region, illustrated, R. A. Daly, The Wood-pulp Industry of Canada, D. P. Penhallow. Nature Study in American Universities, S. B. Sinclair. The Summer Climate of the Yukon and Its Effects on Vegetation, Prof. J. Macoun. Whale and Whale Hunting, Prof. E. E. Prince. Additional notes on the Geology and Pälaeontology, of Ottawa, illustrated, Dr. H. M. Ami.

Excursions: On April, the 19th, about 175 members and friends met at Aylmer and collected Mayflowers, and other plants; also insects and rock specimens. OnMay the 3rd about 50 attended an excursion to Beaver Meadow, and about fifty visited Rideau Park on the 10th May.

Sub-excursions were held in August and September to Hull, Aylmer, Rockcliffe, and the Montreal road, principally by the botanical and entomological branches. Roots of native violets and other perennial plants were collected.

The general excursions were held on the 17th of May and the 2nd of September. These were largely attended, and highly successful.

The Ottawa Naturalist has been published, containing 248 pages and four plates. It contains papers by prominent Canadian scientists on nearly every branch of Natural History.

Report of Branches.

The Geological Branch did good work; the leaders attended all the excursions, and explained the salient geological features of the places visited. The Botanical Branch met twice a month, and report a most successful year's work. The Entomological Branch reports useful work, both in the field and the study. The Ornithological Branch recorded the date of arrival of birds, etc., and gave a list of the birds which breed at the Central Experimental Farm. The Zoological Branch recommends the study of insectivorous and chiropterous mammals. Mr. A. Halkett exhibited at their Annual Meeting three batrachians. Their report shows that during the past session a nucleus of a new collection of Canadian fishes had been collected for the Department of Marine and Fisheries.

Receipts, including Government grant, $571.03; expenditure, $529.30; balance on hand, $41.73.

6. Ottawa University Scientific Society.

The report of the Ottawa University Scientific Society for the year 1902-03 shows that the members met once a week to discuss scientific subjects.

The following lectures were given during the session:—The Metric System, H. J. Macdonald. The Canterbury Tales, Prof. Smoldy. Photography, Mr. Topley. Reptiles, J. Burke. Hydraulics, J. Dowd. Food, Mr. Huxley. The Steam Engine, V. Meagher. Lakes and Rivers, W. Dooner. Digestion, R. Halligan. Insects, Dr. Fletcher.

Receipts, including Government grant, $167.75; expenditure, $167.75.

7. Toronto Astronomical Society.

The report of the Toronto Astronomical Society shows that papers were read as follows:—"Cause of the 25-day Period in the Magnetic Curve," Andrew Elvins. "Astronomical Work for the Autumn," H. Weatherbe. "Kelvin's Theory of the Ether Applied to the Stellar Universe," J. R. Collins. "Ancient Lunar Coast Lines," G. E. Lumsden. "Astronomy in Canada," W. F. King. "New Developments in Wireless Telegraphy," Dr.

C. A. Chant. "Vagaries of the Mariners' Compass," Arthur Harvey. "Celestial Measurements," Prof. De Lury. "Stellar Motions," A. F. Miller. "The Astronomy of Milton," John A. Paterson. "Is the Moon a Dead World?" J. E. Maybee. "Solar Rotation," Arthur Harvey. "Helmholtz," Rev. Robert Atkinson.

A number of meetings open to the public, at the Observatory, were held, at which about 300 persons were given an opportunity of observing Saturn's rings, Jupiter's belts, and the Lunar craters, through a number of telescopes.

The receipts, including Government grant, were $470.60; expenditure, $330.47; balance on hand, $140.15.

8. Toronto Canadian Institute.

The Report of the Canadian Institute, Toronto, shows:—

1. Report of Council. "The Canadian Institute enjoyed a year of prosperity. In all, 21 regular meetings were held, at which 24 papers were read and presented. These may be classified as follows:—Exploration, 1; Philology, 1; Astronomy, 1; Geology and Mineralogy, 2; Biology, 6; Literature, 1; Economics, 1; Psychology, 1; Physiography, 2; Ethnology, 1; Chemistry, 2; Miscellaneous, 4.

"No. 14 of the Transactions, and No. 11 of the Proceedings have been published and distributed."

2. Report of the Biological Section. This section held fourteen general meetings, at which papers and addresses were given in various branches of Natural History; some of the lectures were illustrated with the Lantern, Microscopes and Drawings. These meetings were well attended. In addition, seven meetings of the Council were held for the transaction of business.

During the summer, excursions were made by the Members and their friends to Kew Beach, Humber, Taylor's Mils, Brampton, Don Valley, Hemlock Grove, Black Creek, Scarboro' Heights, and the Humber by boat to the old mill. At these excursions many botanical, entomological and microscopic specimens were obtained.

3. The report of the Librarian shows that during the year the number of volumes and periodicals loaned was 1,221, and the number of scientific archives and journals placed on the shelves, 316. The number of Societies on the exchange list is 513.

The Institute received 132 donations of books and publications, and the total number of exchanges received from different countries were 2,359.

The receipts, including Government grant, were $2,451.95; expenditure, $2,305.87; special deposit, $174.76; balance on hand, $132; total $2,541.95.

9. Historical Societies.

The following grants have been paid to Historical Societies:—

1.	Lundy's Lane Historical Society	$100.00
2.	Niagara Historical Society	100.00
3.	Ontario Historical Society	600.00
4	Peterborough Historical Society	100.00
5.	Wentworth Historical Society	100.00

APPENDIX I.

Admission of Candidates to Collegiate Institutes and High Schools.

Name of School.	Entrance Examination, June, 1903. Examined.	Passed.
Collegiate Institutes.		
Aylmer	88	55
Barrie	114	64
Brantford	208	165
Brockville	97	83
Chatham	169	136
Clinton	67	48
Cobourg	67	47
Collingwood	73	47
Galt	132	114
derich	87	71
Guelph	127	104
Hamilton	581	458
Ingersoll	81	67
Kingston	204	172
Lindsay	90	69
London	382	322
Morrisburg	65	38
Napanee	137	76
Niagara F	58	54
Ottawa	391	265
Orillia	106	66
Owen Sound	192	149
Perth	110	81
Peterborough	159	85
Renfrew	113	61
idgetown	72	63
St. Catharines	99	75
St. Mary's	136	103
St. Thomas	175	102
Sarnia	128	95
Seaforth	78	61
Stratford	206	126
Strathroy	135	85
Toronto (Harbord St.)	391	228
Toronto (Jameson Ave.)	255	123
Toronto (Jarvis St.)	339	225
Toronto Junction	127	66
Whitby	75	53
Windsor	142	108
Woodstock	162	114
High Schools.		
Alexandria	79	39
Almonte	50	42
Arnprior	63	53
Arthur	66	50
Athens	92	63
Aurora	69	42
Beamsville	33	20
Belleville	229	95
Berlin	95	76
Bowmanville	47	36
Bradford	49	39
Brampton	58	48
Brighton	30	25
Caledonia	39	28
Campbellford	75	63
Carleton Place	69	47
Cayuga	34	25
Colborne	40	34
Cornwall	177	103
Deseronto	63	53
Dundas	79	62
Dunnville	32	25
Dutton	68	55
Flora	30	22
Essex	70	52
Fergus	98	47
Forest	61	53
Fort William	56	22
Gananoque	72	48
Georgetown	43	33
Glencoe	91	71
Gravenhurst	70	54
Grimsby	21	20
Hagersville	45	30
Harriston	48	43
Hawkesbury	33	23
Iroquois	83	44
Kemptville	59	24
Kincardine	63	55
Leamington	79	47
Listowel	87	72
Lucan	87	66
Madoc	84	40
Markham	104	85
Meaford	58	42
Mitchell	83	58
Mount Forest	66	47
Newburgh	82	61
Newcastle	22	22
Newmarket	79	51
Niagara	26	22
Niagara Falls South	54	46
North Bay	46	34
Norwood	46	29
Oakville	58	44
Omemee	26	19
Orangeville	55	38
Oshawa	80	54
Paris	67	50
Parkhill	79	50
Pembroke	131	69
Petrolea	72	44
Picton	142	71
Port Arthur	41	22
Port Dover	27	22
Port Elgin	77	54
Port Hope	71	55
Port Perry	62	45
Port Rowan	38	25
Prescott	49	32
Rat Portage	60	31
Richmond Hill	46	34
Sault Ste. Marie	69	63
Simcoe	89	54
Smith's Falls	76	53
Smithville	22	18
Stirling	35	16
Streetsville	24	17
Sydenham	84	50
Thorold	53	33
Tillsonburg	66	45
Trenton	84	55
Uxbridge	60	50
Vankleek Hill	67	48
Vienna	46	31
Walkerton	68	48
Wardsville	25	16
Wardsville	31	21
Waterford	41	30
Watford	69	53
Welland	61	42
Weston	47	35
Wiarton	43	38
Williamstown	43	24
Other places.		
Aberfoyle	35	28
Acton	25	16
Allistan	66	47
Alvinston	40	31
Ameliasburg	35	14

APPENDIX I.—*Continued.*

[illegible] OF CANDIDATES TO COLLEGIATE INSTITUTES AND HIGH SCHOOLS.

	[illegible] Examination, June, 1903.		Entrance Examination, June, 1903.	
	Examined.	Passed.		
Other places.			Other Places.	
[illegible]			[illegible]	
[illegible]		3	Flesherton	1
[illegible]		0	[illegible]	
[illegible]			[illegible]	
Aultsville			Fort Frances	
[illegible]			[illegible]	
[illegible]			Grand Valley .	10
[illegible]			Hanover	
[illegible]			[illegible]	
[illegible]			[illegible]	1
[illegible]			[illegible]	10
Belle River ..			Hensall	
Beaverton ..			Heathcote	
[illegible]			[illegible]	
[illegible]		0	[illegible]	
[illegible]		0	Huntsville	
[illegible]			[illegible]	
Blenheim			[illegible]	32 1 19
[illegible]			[illegible]	19
[illegible]		1	Kintail ..	
[illegible]			[illegible]	19 11
[illegible]		32	Lakefield	
[illegible]			[illegible]	31
[illegible]		1	[illegible]	12
[illegible]			[illegible]	
[illegible]			[illegible]	12
[illegible]		1	[illegible]	No report received
[illegible]			Little Britain	
[illegible]			London East ..	
Burritt's Rapids			[illegible]	
[illegible]		1	[illegible]	
[illegible]		1	[illegible]	No report received
Carp			[illegible]	29 20
Castleton			[illegible]	
[illegible]			[illegible]	
[illegible]			[illegible]	
[illegible]

APPENDIX I.—*Concluded.*

Admission of Candidates to Collegiate Institutes and High Schools.

Name of School.	Entrance Examination, June, 1903. Examined.	Passed.
Other Places.		
Port Colborne	19	16
Port Stanley	13	9
Princeton	18	6
Powassan	37	15
Randwich	12	3
Riceville	12	8
Richmond	45	27
Ridgeway	23	17
Ripley	31	21
Rockton	33	25
Rockwood	39	31
Rodney	37	28
Rosemont	9	5
Roseneath	11	9
Russell	36	23
St. George	15	8
St. Helen's	22	15
Sandwich	39	21
Schomberg	12	9
Schrieber	13	5
Selkirk	24	16
Sharbot Lake	25	9
Shelburne	36	14
South Mountain	37	17
Sparta	21	15
Spencerville	24	7
Springfield	36	14
Stayner	65	54
Stoney Creek	39	33
Strabane	29	24
Sturgeon Falls	25	15
Sudbury	32	17
Sutton West	31	20
Tamworth	25	14
Tara	28	21
Tavistock	13	11
Tecumseh	21	12
Teeswater	60	12
Thamesville	50	39
Thedford	28	18
Thessalon	No report received	
Thornbury	27	19
Tilbury	59	46
Tiverton	20	14
Tottenham	39	20
Tweed	43	21
Uptergrove	40	31
Wallaceburg	65	53
Warkworth	28	22
Waubaushene	38	31
Wellington	41	18
West Lorne	32	19
Westport Separate School	36	24
Winchester	104	67
Wheatley	10	6
Wilkesport	23	15
Wingham	60	51
Woodbridge	21	17
Woodville	21	12
Wolfe Island	33	15
Wooler	16	11
Wroxeter	19	18
Wyoming	38	20
Zephyr	22	17
Zurich	25	21
Summary :		
Collegiate Institutes	6,418	4,524
High Schools	5,858	4,094
Other Schools	6,782	4,385
Grand totals, 1903	19,058	13,003
Comparison with June, 1902 Increase	971	
Decrease		297

REPORT

OF THE

MINISTER OF EDUCATION,

PROVINCE OF ONTARIO,

FOR THE YEAR 1903.

PART II.

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO.

TORONTO:
Printed and Published by L. K. CAMERON,
Printer to the King's Most Excellent Majesty.
1904.

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO

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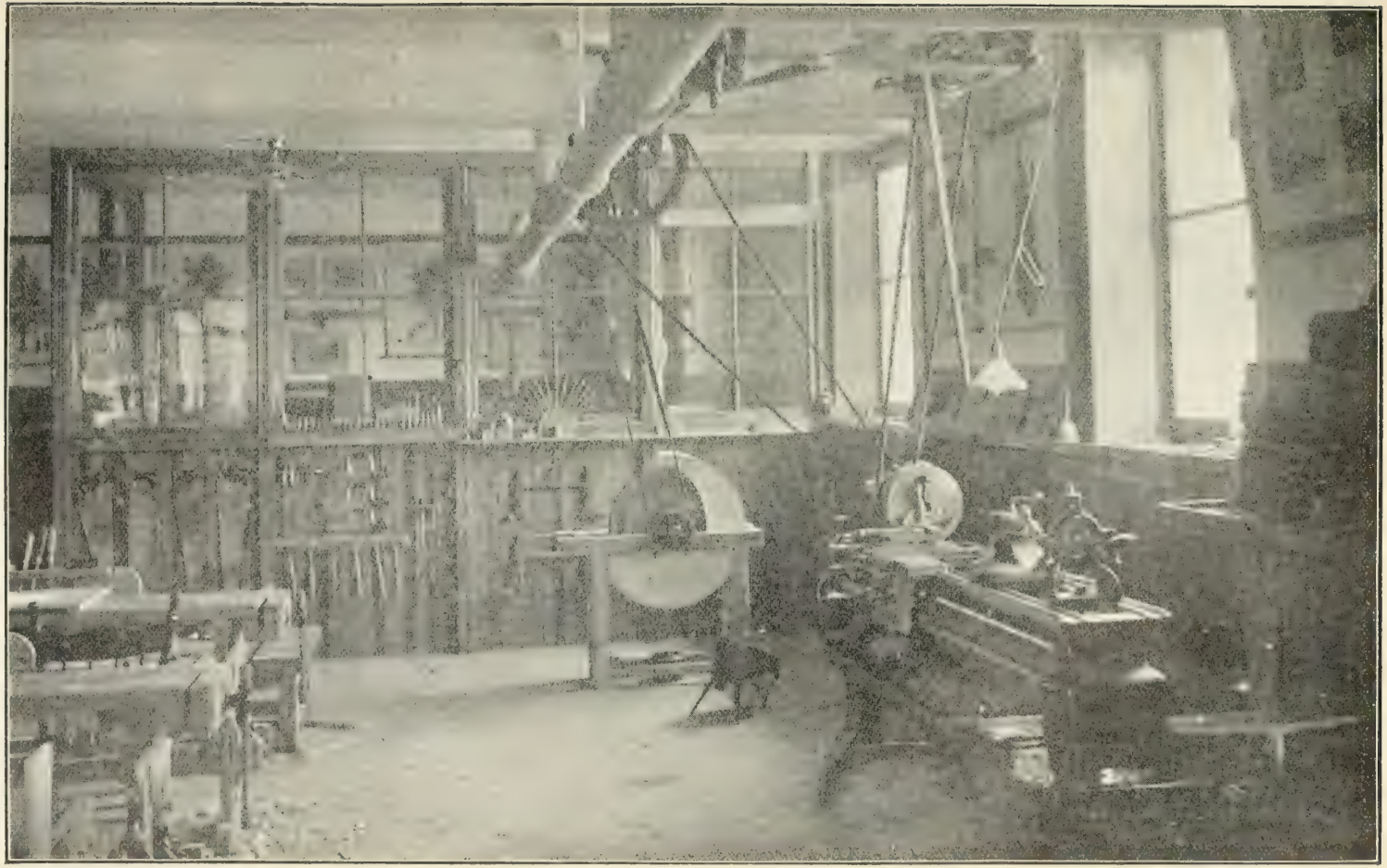
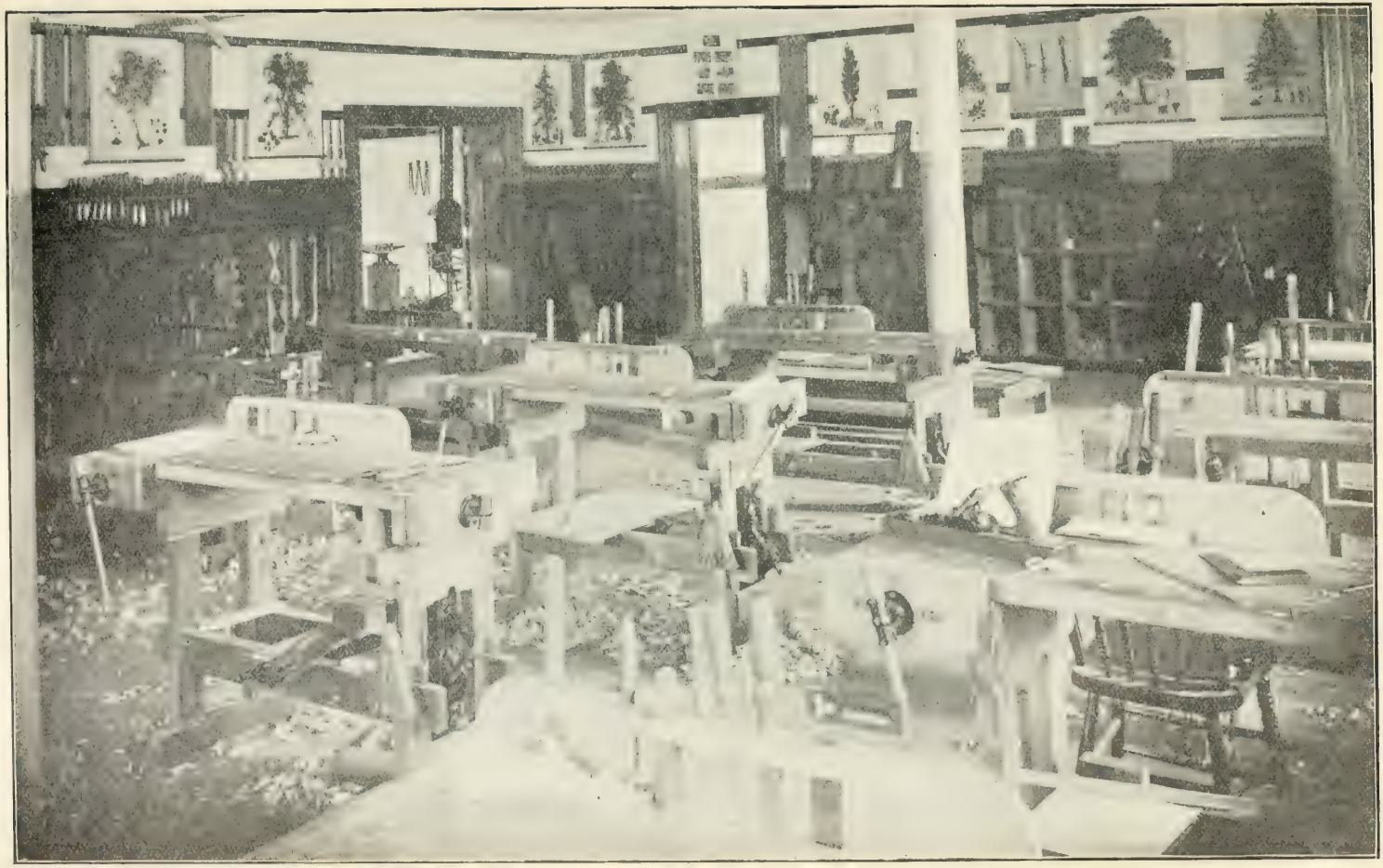
Household Science Class, Dominion Exhibition. Toronto, 1903.

Manual Training Class, Dominion Exhibition, Toronto, 1903



Lathe Section, London Normal School.



Manual Training Department, London Normal School.

Manual Training Department, London Normal School.

Manual Training Department, London Normal School.

REPORT

OF THE

MINISTER OF EDUCATION

For the Year 1903.

PART II.

APPENDIX J.—*MANUAL TRAINING AND TECHNICAL EDUCATION.*

I.—Report of Inspector Leake.

To the Hon. Richard Harcourt, M.A., K.C., LL.D.,
Minister of Education, Toronto:

Sir,—I have the honor to submit my third annual report on Manual Training and Special Technical Instruction as carried on in this Province during the year ending December 31st 1903.

Great strides have been made. The newer practical studies have steadily grown in public favor, and the question of their introduction is being seriously considered in many places, not at present including them in their curriculum. Amongst these are Galt, Collingwood, Waterdown, Owen Sound, Peterborough, Chatham, St. Thomas, and Ingersoll. New centres have been opened in Essex, Hamilton, Guelph and Berlin. Schools now receiving the Government Grant for Manual Training are situated in the following places: Toronto (6), Ottawa (7), Kingston, Brockville, Stratford, Berlin, Brantford, Woodstock, London, Renfrew, Hamilton, Essex, Guelph, Cobourg, Ingersoll.

On the invitation of the Ingersoll Board of Education I had the pleasure of addressing its members and giving them information as to how they could introduce the subject. Acting on my recommendation they sent a deputation to Brantford, Guelph, and Stratford, to see the work in process, and though the deputation contained at least one member opposed to its introduction, the information they gathered, and the work they saw, led to an enthusiastic and unanimous recommendation to install both Manual Training and Household Science. I know of not one instance where this course has been followed, in which the report on the work has been unfavourable, and which did not result in a similar recommendation. In this way each school established and properly equipped acts as a powerful advocate, and affords a most useful object lesson, thus assisting in the formation of others. During the year, meetings have been addressed in Peterborough, Toronto, Berlin, Ottawa, Chatham, Waterdown, Hamilton and Ingersoll. Everywhere I find the educational authorities anxious to acquire information as to the most economical and effective method of introducing these subjects. If anything approaching the present rate of progress be maintained it will not be long before every town and city in the Province will have a Manual Training room attached to the Public and High School.

Wider Conceptions and Broader Ideas.

Progress has not only been made in the actual number of centres opened, but a broader and more complete view is being taken of the meaning and place of the subject in the curriculum, and what is perhaps of no less importance, its limitations are being recognized. The almost traditional opinion that the subject consisted of a series of rigid exercises, models, or projects is being gradually abandoned--rather reluctantly in some places—and its effect as a general educational instrument, and the scope it offers, in conjunction with other subjects for mind training are being admitted. The fear that if time were taken from the more academic subjects, general efficiency and educational success, as measured by examination results, would be impaired, has not been justified, for in the schools taking the subject there has at least been no falling off in these respects, while all the Principals, with perhaps one exception, are of the opinion that the effect of its introduction has been to prolong school life, and to brighten and vivify the academic subjects.

The cause of Manual Training in many countries has reason to pray to be delivered from its friends. There is not a subject in the curriculum that has suffered more from the intemperate advocacy of its supporters, and this certainly gave some reason for the belief that it was regarded by its advocates as a universal panacea for all the ills that educational flesh is heir to; but now extravagant claims are being laid aside, and it is winning its way and demonstrating its right to an important place. The idea rather prevalent one or two years ago that the subject was simply a fad and a mere catch or excrescence on an already overcrowded curriculum is disappearing, and successful attempts are being made to co-relate the work with other subjects and with the home and outdoor life of the pupil. Its value in this connection is not yet, however, fully recognized. There is scarcely any one subject in the curriculum, regarded of itself, that is of vital importance. Each obtains its worth, and is capable of doing its best work by its connection with all others, and the closer this inter-relationship can be made, and the more effectively it is carried out, the greater will be the success of all efforts to achieve educational efficiency. Manual Training is no exception to this rule.

Macdonald Manual Training Fund.

At the conclusion of the last school year (June 30th) the period of three years during which this fund maintained centres in Toronto, Ottawa and Brockville expired, and we can now estimate to some extent the work done by it. Fifteen complete equipments for twenty boys, and one for thirty, have been presented to the towns named. These equipments represent a money value of about $10,000 in addition to the expenses of three years' maintenance.

When inaugurated the objects aimed at by the fund were as follows:—

(1) To secure the adoption of Manual Training as an integral part of the educational system in every town where centres were established.

(2) To educate public opinion to see the desirability of and the necessity for the inclusion of the subject in the curriculum.

(3) To train, as far as opportunities presented themselves, or could be made, teachers qualified to give instruction in elementary Manual Training.

These three objects have been successfully accomplished, and now the work passes out of the control of a private fund into that of the Education Department. From the inception of the movement the Department has been in entire sympathy and accord, and it is hardly necessary to say that without

its cordial co-operation and active assistance these results could not have been achieved. Another reason for this success is that the soil on which the seed was sown was not only fertile, but was to some extent prepared, and the time ripe. The teachers of the Province, speaking generally, are alive and sympathetic to new movements, and keep themselves aware of, and in touch with, progress in other countries, and were thus prepared to cordially welcome the new movement and offer every facility for its fair trial. Classes for Public School teachers in cardboard modelling, woodwork, and clay modelling have been organized, holiday courses held, and special training courses (aided by a substantial bonus to each student, from the Department) instituted. Every teacher, with one exception, now engaged in this Province has been trained, more or less efficiently, by the efforts of this fund, and others have been supplied to British Columbia, Quebec, and New Brunswick, while two have been captured by the United States.

To Sir W. C. Macdonald, who generously supplied all the necessary funds, and to Dr. J. W. Robertson, who unstintingly gave of his energy, even to the sacrifice of his health, our earnest thanks are due.

Regulations.

The great and rapid increase in the number of these schools rendered necessary the adoption of regulations, under which they should be conducted, and the Departmental grant awarded. After considerable discussion and revision a provisional scheme was formulated in March last, and has been put into fairly successful operation. A consideration of the grants awarded cannot fail to lead to the conclusion that the Department has treated these subjects in no niggardly spirit. In New Brunswick, the grants paid are half the cost of equipment, plus $50. per annum to the teacher, "provided, however, that no manual training department shall be organized in any school unless there are at least ten pupils who shall take such manual training course, and who shall devote *not less than three hours per week to the work*." (The italics are mine.) In Nova Scotia a sum of fifteen cents for each two-hour lesson is granted but not to exceed $600 for Manual Training and Household Science combined. It will be seen that these two Provinces stipulate as to the minimum length of each lesson, and our own regulations might perhaps be beneficially amended in this particular. The question of registration should also be attended to. In some schools accurate records are kept of attendance and work done, and are found of much service, while in others no attention is paid to the matter.

The regulations have this year been somewhat difficult of application owing to:

1. The fact that extremely large grants had previously been given which could not be maintained as the schools grew in number, and

2. That the year's work was commenced before the scheme was formulated, and with the expectation of receiving the same grants as had previously been paid.

Though all schools may agree in thinking that they have not received the amounts expected, yet no one school will be able fairly to say that it has been treated differently from any other school. Attention should be drawn to No. 1 of the regulations, as there is a tendency in many quarters to think that any room, especially if it be a basement, and one which would be instantly rejected as a class room, is suitable for Manual Training purposes.

Normal Schools.

During the year the Department has installed a complete woodworking equipment at the Normal College and has added considerably to that at

Toronto Normal School, particularly on the metal working side. London has already an equipment of metal work and the addition of one or two wood-turning lathes would add to the efficiency of the wood-working appliances. The quarters at present available for the work in Ottawa, are not of the highest character, and when additional space is available considerable addition will have to be made to the equipment to place it on an equal footing with the Normal Schools at Toronto and London. As the work grows it will be necessary to supplement the present wood-working equipment at the Normal College by the addition of appliances for metal work, as teachers of Manual Training in the High Schools cannot be considered as qualified unless they have some knowledge of this branch. It is now reasonable to expect that these four institutions will do something towards training teachers for these special subjects.

A particularly interesting feature of the work in both Ottawa ond London is the large number of ladies taking woodwork. It does not appear probable that ladies will ever become common as teachers of woodwork in Canada, as is the case in the United States, judging by the fact that the half dozen now qualified have failed to secure appointments, but the girls themselves profess to have received great personal benefit from the training, and there is every reason to believe that this is the case.

Model Schools.

The County Model Schools are the only institutions in the Province, having to do with the training of teachers, in which Manual Training has hitherto had no place and it would be a decided advantage if this could be remedied. It is useless to attempt any change with the present short term, but when this is lengthened, elementary Manual Training could well be introduced. As most of the students take charge of rural schools, they should have training in those forms of practical work which can be carried on in the ordinary room without any elaborate equipment. A month's course would give to the Principals of the Model Schools some acquaintance with the foundation of, and some skill in, practical work of this character, and much good would result to the rural schools which have not yet felt to any appreciable extent the influence of these newer studies. The problem of Manual Training in rural schools is quite different from that in the schools of towns and cities, where special rooms can be fitted and special teachers employed. In these schools the work must be taught by the regular teacher in the ordinary class room. In New Brunswick particular attention is being paid to this matter. Special courses have been established to give a period of three months' training, while in Nova Scotia no rural school is graded 1st class unless it has at least one bench and a set of tools.

Preliminary Manual Training.

I am pleased to be able to record that the necessity for some preliminary or elementary Manual Training is being recognized. In several centres it has already been introduced, while in a number of others preparations are being made tending towards this. Simple mechanical and scale drawing, brush and color work, clay modelling, cardboard modelling, basketry, weaving, wire-work, etc., all afford opportunity in the hands of a resourceful teacher for valuable training. The boy, who has received this training, will enter upon the more advanced work with ideas of accuracy and perseverance, and the necessity for care and thought which he would not otherwise have had. The most progressive educators are all agreed as to the great value of work

of this kind ,but its importance in primary education has not yet been fully recognized in Ontario. Manual Training and Technical Education have advanced with rapid strides in the United States during the last decade, but the progress that has been made in the adoption of "busy work" in primary education is even more remarkable. There is scarcely a magazine published in the States, dealing with primary education, that does not devote a large portion of its space to helps for teachers along these lines. In several centres the teachers are already equipped for this work—notably, Ottawa, Toronto, and Brockville, where classes for their instruction have been held for the past three years. The Ottawa School Board has appointed a special teacher to take charge of classes in cardboard modelling. The teachers of Coburg, Stratford and Guelph are also attending classes. When Manual Training is taken in all grades of our educational system from the Kindergarten to the Normal College, the teachers should be just as well equipped to teach it, as they now are to teach arithmetic or any other subject, and this is the end to be aimed at.

Training of Teachers.

There will always be an opening for special teachers of Manual Training and some steps should be taken to meet this demand. That it is urgent is shown by the fact that one school has had to postpone its introduction until September next owing to inability to secure a teacher and this though rooms were obtained and equipment ordered. Owing to the lack of special training facilities four of our teachers went to the States with the intention of qualifying themselves for advanced work, but, unhappily for us, two of them remained, as more lucrative positions were offered to them than they could obtain in Ontario. Arrangements were completed in June last for a special course of one year's duration, to be held at London Normal School, but difficulties arose and the project had to be held in abeyance. Perhaps the Macdonald Institute at Guelph, when it gets to work, and has its organization completed, will be able to supply us with the teachers we require. If this is to be the place where our teachers are to be trained, then some agreement with the Education Department is necessary as to qualifications for admission, course of study, length of course, etc. At present the most urgent necessity is for men with High School qualifications. In a number of the Collegiate Institutes there are not sufficient pupils to employ a teacher's whole time, and the balance must be spent in ordinary collegiate work.

Summer Schools.

During the past four years, summer schools have been held in Toronto, Ottawa, Brockville, and London, and have achieved a certain amount of success, but their usefulness might be considerably increased. As the time during which these can be held is necessarily limited, the attention of the students should be concentrated on two subjects at the most, and not frittered away on half a dozen, as has been the case hitherto. To attempt to do any serious work on half a dozen subjects in three weeks is absurd, and a waste of time for both teacher and taught. A special course in elementary Manual Training should be given. It is a point worthy of consideration whether the Manual Training taken at the summer schools might not with greater advantage be devoted to work of this character rather than to the woodwork which has been taken up to the present. A large proportion of the students attending these schools are ladies, who will never be required to teach woodwork, while the majority of them would at once have facilities for putting into

practical use elementary work suitable for the lower grades. Certificates have been granted for attendance, but it should be more clearly understood that these are for attendance only, not for efficiency, and that their possession confers no qualification to teach the subject for which they may be granted. This is not understood at present, and at least one educational authority has accepted a certificate gained at one of these schools, as the Departmental sanction and approval of the qualifications of a Manual Training teacher.

Art Examinations.

The duty was assigned to me of superintending the Art Examinations, and at their conclusion I presented a report on the whole subject. Some remarks then made may very well be summarized here. The prominent feature of the results was the large number of candidates rejected. In the advanced course 61 per cent. were rejected, in the primary course, 59 per cent., and in the mechanical course, 34 per cent., and this when a pass required only 40 per cent of the possible marks. The whole question of art instruction and examination demands serious consideration. There has been a far too liberal distribution of certificates: the teaching, if judged by examination results, is inefficient: the examinations are not regarded seriously, and the courses are not suitable.

Since the organization of this branch of the Department there have been issued 82,398 certificates, "the bulk of which have no market value that would enable the recipient to get a position where a knowledge of drawing is required."

The reform that would meet with the most general approval would be the abolition of the present examinations and the organization of a series for the purpose of qualifying teachers. The attention that is at present paid to drawing in all our schools for the training of teachers is insufficient. The courses taken in Model and Normal Schools and College should fit teachers to give instruction in the subject. At the conclusion of the school or college course, a special all round examination should be held, and no certificate awarded unless the candidate secured 60 or 70 per cent. of the possible marks. This would then really qualify the teacher to give instruction in the class of school for which his professional certificate would be available. The adoption of some such plan would give a progressive course, which all candidates for the teacher's diploma would be obliged to take. In these courses blackboard and free arm drawing should have a prominent place. The present examination in blackboard drawing is a complete failure, as far as enabling the teacher to use the chalk with facility is concerned. A Provincial art school, with proper financial support, efficient teaching, and suitable quarters, might control its own examinations, awarding diplomas, etc., at its discretion. The ability of the students holding such would quickly determine their value. The method of awarding grants according to the number of certificates earned should be abolished.

Exhibitions.

The closer the touch and the more intimate the relation of the parents to all our educational effort, the greater will be its success, and the more lasting its results. Successful attempts have been made in various parts of the Province to strengthen this touch and deepen this relationship, by holding exhibitions of the work done or by occasionally throwing the classes open to the inspection of the parents. In Cobourg, Brockville, Ottawa, Toronto, and London, exhibitions of the work have been made at the various fairs,

and have attracted much favorable attention. In addition to this, "parents' day" has become a recognized feature in many schools. Work of this kind, done with a view to securing popular approval, must not be carried too far, or its educational value and significance will be apt to be relegated to the background. The most ambitious attempt made in this direction was that at the Dominion Exhibition held in Toronto. A large room was divided into three portions for Kindergarden, Manual Training, and Household Science, respectively. During the whole time the exhibition was open classes of boys and girls were at work under competent teachers. The demonstration hall was invariably crowded. The necessary expenses were borne by the Education Department and their thanks are due to the teachers of the various classes, who gave their services freely and liberally. The equipments were lent by the Toronto School Board and Mrs. Massey-Treble. Photographs of many of the Manual Training rooms in the Province were shown, together with a collection of models worked by the boys at Ryerson Public School, Toronto.

Considering the importance of a practical education having a close relation to the industrial life of the community, and the necessity of informing the people on these subjects, it might not be too much to hope that in the near future it will be possible to erect a permanent building to be devoted entirely to education and its progress.

Manual Training and Technical Education.

The foundation of all technical education should be "the Manual Training courses of the elementary school, not with the object of producing artisans of any kind, but for education alone." In accordance with this opinion of Dr. Seath, the Education Department has done wisely in concentrating its energies upon the foundation before attempting to raise a superstructure, and if technical education is ever to achieve anything worth while, much attention will have to be devoted to adequate preparation in the preliminary stages, for it is a complaint of old standing that students enter technical schools totally unprepared for the work they wish to take up. Manual Training properly means any training in hand work designed primarily to improve the powers of the mind. Technical education is the training given applicable to a special calling. The student who undertakes any form of it has generally the very definite end in view of making it of direct commercial value. Its object is thus economic or utilitarian. In the two divisions —Manual Training and Technical Education—the two aims—educational and economic—to some extent overlap, and this overlapping cannot be prevented even if it were desirable that it should be. Technical Education, involving, as it does, Manual Training, has also an educational value, and Manual Training an economic one, especially in the higher forms. When we come to the basic reason for the foundation of systems of education, we find it largely utilitarian, and it is no argument against anything educational to say that it is utilitarian. Primary schools were established for the children of the "common people," to teach them "to read, write and cast accounts." High schools were to fit young men for colleges which were to train them for the professions. Educational values are undergoing revision. Is it not possible to unite both aims in our curriculum?

Now that Manual Training is firmly established, it is time to consider a wise extension, having in view a more direct application to trade and industry. Though we may obtain valuable hints and suggestions from the methods of other countries, there is no land that can supply us with a ready-made plan suitable for our own. Conditions are different and circumstances

are peculiar. We must work out our own salvation. In the applied science schools of our universities, we probably have enough technical schools of college rank. Their main function is to train men for the engineering professions, who shall intelligently direct the application of natural forces to industrial and economic problems. What is now required, is something intermediate between these and the Manual Training schools. It is extremely doubtful whether for many years to come there will be any necessity for an elaborately equipped technical school in any place other than Toronto. In a number of our larger Collegiate Institutes there should be established a technical course, having relation to the industrial life of the district and the future occupation of the students. These should be distinct in aim and purpose from the usual academic course. Those schools having equipments for wood and metal work are admirably suited for courses of this character. One central school equipped and organized as some of the schools in the United States, but modified to suit our conditions, and technical extensions in several of the Collegiate Institutes, as suggested above, would adequately meet our requirements for many years. In work of this description it is essential that there should be equipment for practical application of the theories taught. Technical Instruction, so called, given in institutions lacking this equipment, only touches the very fringe of the subject. We have a striking illustration of the truth of this in the Ontario Agricultural College. Would the status of this institution have been so high had its work been restricted to scientific lectures on the growth of crops, the constituents of the soil, feeding of cattle, or the chemical processes of buttermaking? All this has been done, but it is the practical work on the farm and in the dairy that has given it life, and made the college what it is. Kingston Collegiate Institute has had such a course as that suggested for the past three years, and the results it has achieved have more than justified its establishment. Brantford has this year organized a course of the same character. In the formation of such courses the manufacturers of the district should be consulted, and their ideas and opinions have due weight attached to them, as they may be presumed to know the requirements of the neighborhood.

The question of Trade Schools is an important one, and worthy of some consideration. At present our industries have not become so specialized as to render the formation of such schools possible or desirable in any but the largest centres. If effectively organized and efficiently equipped, two or three such schools dealing with the typical trades of Toronto might do a useful and necessary work. At present organized labor is decidely opposed to them, but if their function were properly understood this opposition would disappear, as it has in the matter of Manual Training Schools.

Evening Schools and Classes.

In my last report I called attention to the fact that a Collegiate Institute possessing wood and metal work equipments offered excellent facilities for the organization of evening classes in various technical and practical subjects for artisans and mechanics. I regret not to be able to record much progress in this direction. Every country that has paid adequate attention to the question of technical education has largely developed the system of evening classes, and looks upon them as an integral part of its educational system. Such classes in Ontario would prove of great service to those engaged in the day time. Their organization should not prove difficult, as all the necessary requirements are at hand. These classes, when carried on under the approval of the Department, should receive aid and recognition. Such classes are meeting with much success at Brantford.

Libraries.

A matter urgently requiring attention is that of technical libraries. A section of the school library could well be set apart for books dealing with practical subjects. In some centres this is being done in connection with the Public Library. During the year there have been added to the libraries at the Normal Schools 22 books dealing with all forms of Manual Training. All through the Province I am being continually asked to recommend books on these and technical subjects. It would be advisable for the Department to publish a brief bibliography giving particulars of these and of various other sources of information open to the teacher.

I am your obedient servant.

ALBERT H. LEAKE.

Toronto, January, 1904.

II. HOUSEHOLD SCIENCE REPORT.

Hon. Richard Harcourt, Minister of Education:

Sir,—In presenting the first general report on Home Science for the Province of Ontario, a brief outline of the introduction, organization, and progress of this subject may lead to a clearer understanding of its purpose and place in the field of education.

Introduction.

In 1894 the first step was taken by the Department of Education to introduce Domestic Science into the schools of Ontario by amending the Schools Act so as to permit Trustees to add this subject to the school course. Previous to that time schools of cookery had been established in Toronto, Hamilton, and Ottawa, under the auspices of the Young Women's Christian Associations, and the training given in these schools served at a basis upon which to build some standard of efficiency for teachers of domestic science in the schools. The Department of Education arranged for special examinations for the graduates of these institutions. It proved that a system of training carried on under the auspices of philanthropic societies, and lacking unity of method or purpose, was not a satisfactory preparation for teachers in the Public and High Schools, where it is essential that the subject shall be correlated with the studies, and pedagogical principles applied.

Organization.

In February, 1900, the Ontario Normal School of Domestic Science and Art was established in Hamilton, in affiliation with the Ontario Normal College, and aided by the Department of Education. Being the first school of the kind in Canada, it was somewhat difficult to organize the work on distinctly educational lines. The unpreparedness of the students; the idea of cookery rather than home science prevailing among the parents and pupils; the absence of accurate data; the isolation from other school studies; the crowded curriculum, and many other obstacles had to be overcome before the subject could be treated intelligently and a suitable course of study adopted.

This school, the graduates of which are filling nearly all the responsible positions in the Province, as well as receiving special recognition in the United States, adopted the following course of study for the training of teachers:

COURSE OF STUDY ONTARIO NORMAL SCHOOL OF D. S. AND ART.

FIRST YEAR.

Foods.—Composition and nutritive value of food, menus, dietaries. Lectures and discussions.

The Educational Value of Domestic Science.—Discussion of the relation of D.S. to other school studies, and of reading on the subject.

Household Economy.—A study of the house, from its situation to the systematic management and daily care. Lectures, collateral reading and discussion.

Bacteriology.—A study of its principles and application to life.

Chemistry.—So arranged as to prepare the pupil for a comprehension of the principles underlying cookery, laundry work, cleaning, management of fuels, illuminants, etc.

Physiology and Hygiene.—The function and structure of the body, with special attention to digestion. Personal and public Hygiene.

Emergencies.—Lectures and demonstration lessons in bandaging, etc.

Home Nursing.—Lectures and demonstrations.

Psychology.—Lectures.

History of Education.—Lectures.

Science of Education.—Lectures and discussions.

Sewing.—A series of models, including the various stitches, study of fabrics. Method of teaching sewing to large classes, etc.

SECOND YEAR.

Normal methods.—Principles and relation of domestic science to other school studies. Planning and presentation of lessons.

Practice Teaching.—By students, under the supervision of the Principal. Conferences, criticism, etc.

Advanced cookery.

Advanced Chemistry.—Organic and physiological chemistry, and chemistry of food.

Demonstration Lectures.—By senior students. Observation and discussion of lecture by the class.

Home Economics.—Study of social conditions; household expenditure, food, and labor problems; valuations and standards of living. The ideal home.

Dietetics.—Calculation of dietaries for various classes, invalids, etc.

Sanitation.—Study of principles conducive to healthful conditions, plumbing, etc.

Advanced Sewing.—(Elective.)

Physiology and Hygiene.

Quiz.—By the Principal on the principles and application of the various subjects.

The educational aspect of the work is emphasized the first year, while the second gives special attention to the professional. Owing to the absence of previous training it has been difficult to qualify even experienced public school teachers in one year. But with the organization of classes covering

the elementary work in the Normal Schools, in harmony with the course provided for specialists in domestic science, much better results may be obtained.

Requirements for Admission.

Students entering for the one-year course require a first-class teacher's certificate, or a university degree. For the two-years' course, a junior leaving certificate, university matriculation or its equivalent.

Diplomas.

Upon the satisfactory completion of the Normal course, a diploma is awarded, which includes the diploma given for domestic science, by the Department of Education, without further examination.

Influence of Domestic Science Instruction.

The changed attitude of the student towards domestic science has been one of the most encouraging results of the new education. The students, including experienced Public School teachers, invariably become enthusiastic over their work, and freely acknowledge the benefit derived from such instruction.

Progress.

In 1897 the first attempt to give organized instruction in domestic science to Public School children was made in Hamilton. Ten classes, of twenty-five in a class, received instruction two hours weekly. Since the opening of the Normal School of domestic science, classes have been sent regularly from the Public Schools.

Sewing.

In September, 1901, a supervisor of sewing, a graduate of the Ontario Normal School of D.S. and A., was appointed by the Hamilton Board of Education. Previous to that time sewing had been taught in a haphazard fashion, without method or any appreciation of faculty development. The marked change, since the introduction of systematic instruction, has been recognized by teachers and parents, who unite in approving of this method of education. One half hour weekly is devoted to instruction in sewing to the pupils of the 1st and 2nd first book classes, and extending in time to one-hour lessons to the second book class. The work is graded, and its extension follows the promotion of the pupil. In addition to a study of the various stitches, a knowledge is given of the construction of fabrics in common use; drawing is introduced in the designing of simple patterns, which are outlined by the pupils. Talks are given by the teacher on the manufacture of needles, thread, etc., and a foundation laid for a more intelligent appreciation of the various industries engaged in the production of clothing, etc.

Stratford. In April, 1901, the School Board of Stratford established the first classes in domestic science as an integral part of the school system. A graduate of the Ontario Normal School of D.S. and A. was appointed instructor. An unoccupied room in the Central School was thoroughly equipped,

and nine classes from the Public Schools and one from the Separate School received weekly instruction in this centre. During the following year a new building was erected, adjoining the Collegiate Institute, for the accommodation of Manual Training and Domestic Science classes. Upon removing from the Central School to the new building, three classes were added from the first and second junior forms of the Collegiate Institute, making an attendance of three hundred and thirty-three.

Time. The time allowed for such instruction is one lesson of two hours weekly for the Public Schools, and two lessons of one and one-half hours weekly for the Collegiate Institute pupils. The work is practically the same for all classes at the beginning, but as pupils are promoted the grade of work is advanced accordingly.

Renfrew. In December, 1901, Domestic Science instruction was introduced into the High and Public Schools of Renfrew. An excellent equipment was provided in a large and cheerful room in the High School building. A graduate of the Ontario Norman School of D.S. and A. was engaged as instructor, who has also charge of the kindergarten department. Fifty pupils from the High School, and sixty-five from the Public School receive two hours instruction weekly in Domestic Science.

Brantford. In January, 1902, eleven classes from the Public Schools and two from the Collegiate were organized in Brantford. In consideration of a Government grant, and an allowance from the School Board, the Y.W.-C.A. provided a suitable room, equipment, cloak, and store room for Domestic Science instruction. A graduate of the Ontario Normal School of D.S. and A. was placed in charge, and a course similar to that adopted in Stratford has been followed.

Belleville. In March, 1902, the School Board of Belleville accepted the offer of the Albert College authorities to allow a limited number of Public School pupils to attend classes at that institution, where a complete equipment had been provided, and a graduate of the Ontario Normal School of D.S. and A. engaged as teacher of Domestic Science.

London. In September, 1902, a handsomely-equipped class-room was provided in the Collegiate Institute, in which nine classes receive instruction in Domestic Science weekly. One hour and forty minutes is allowed for each class. A graduate of the Toronto School of Domestic Science is in charge of the work. One lesson monthly is given in sewing to the pupils of the Collegiate Institute.

Hamilton. In January, 1903, an arrangement was made between the Department of Education and the Hamilton Board of Education whereby the pupils of the Collegiate Institute were allowed the use of the handsomely-equipped Domestic Science class room provided for the students of the Ontario Normal College. Ten classes from the Collegiate Institute receive weekly instruction, and in September of the same year three classes from Public Schools in the vicinity were added to this department. In September, 1903, upon the removal of the Ontario Normal School of D.S. and A. to the Macdonald Institute, at Guelph, the Hamilton Board of Education rented the classrooms formerly occupied by the Training School for Public School purposes. Fifteen classes attend this centre weekly. A graduate of Oread Institute, Worcester, Mass., is in charge of the work.

Berlin. In October, 1903, ten classes were organized for instruction in Domestic Science in Berlin. A very fine equipment, a duplicate of that in use at the Ontario Normal College, Hamilton, has been provided, and a large and imposing building is in process of erection, in which every modern improvement will be found for giving thorough instruction in Domestic Science

and Manual Training. A graduate (gold medalist for 1903) of the Ontario Normal School of D.S. and A. is in charge of the work in Berlin.

Toronto. In September, 1903, a supervisor of Domestic Science and Art was appointed by the School Board of Toronto to organize the work in that city, and to give special instruction in sewing to the Public School teachers. A graduate of the Ontario Normal School of Domestic Science and Art was chosen for this responsible position. Two centres are being handsomely equipped for Domestic Science instruction, and will be opened in a few weeks. A graduate of the Toronto Technical School, and a graduate of the Ontario Normal School of D.S. and A. will be in charge of these two centres.

Ingersoll. The School Board of Ingersoll recently decided to introduce Domestic Science into the schools of that town. An equipment is being provided, and classes will begin early in the new year.

The Ontario Normal College.

In order that all teachers should understand the relation of Domestic Science to the other school work, the Principal of the Ontario Normal College applied to the Department of Education for an equipment and teacher for that subject. A most complete equipment was provided, and in February, 1903, classes were established under the instruction of a graduate of the Ontario Normal School of D.S. and A. (the gold medalist for 1902), and an honor graduate of Queen's University.

Normal Schools.

For some years the students of the Toronto and Ottawa Normal Schools have received instruction in Domestic Science at the Y.W.C.A. schools, but the growing importance of the work required a more direct connection with the system of education, and the first step was taken in this direction in September, 1901, when a complete equipment was provided for the students at the Normal School in London. A special teacher (a student of Pratt Institute) was appointed to give instruction in Domestic Science and sewing two hours weekly to the students in attendance at the London Normal School.

Ottawa. Sewing has been taught in the Ottawa Normal School, but it was only in the spring of 1903, that a complete equipment was provided for instruction in Domestic Science. A special teacher is in charge of both subjects

Toronto. A handsome new building has been erected during the past summer, adjoining the Department of Education, in which most complete provision has been made for instruction in Domestic Science. A graduate of the Ontario Normal School of D.S. and A. has been placed in charge of the work in this school.

Course of Study. The course of study prescribed for the Normal Schools is designed chiefly to establish a better understanding of the place and value of Domestic Science in the general system of education, and to secure its correlation with other school studies. While the course provided at the Normal Schools does not qualify a student to teach Domestic Science, it is accepted as an equivalent to the first year's work at the special training school.

Special Training School for Teachers of Domestic Science.

While the Ontario Normal School of Domestic Science and Art fulfilled the purpose for which it was established, viz., to open the way for special instruction in Domestic Science on an educational basis, and to meet the immediate demand for teachers of this subject in Ontario, it was difficult to provide the thorough training necessary for specialists in this subject, under existing conditions. Its limitations and the necessity for a more suitable building, with proper laboratories, attracted the attention of Sir William Macdonald, with the result that Canada now possesses one of the most complete (if not the most complete) Schools of Domestic Science in the world. Two buildings, one completed, the other in process of erection, for the accommodation of students who may desire to specialize in Manual Training, Nature Study, and Domestic Science, have been provided by Sir William Macdonald at a cost of nearly two hundred thousand dollars. The Macdonald Institute, Guelph, Ont., opened in October, 1903, for the reception of students for the Normal class in Domestic Science and Art. The other departments open in January, 1904. Adjoining the Macdonald Institute building, a handsome residence, with accommodation for one hundred and twenty-five students, is being erected, and will be ready for occupation next September. This school, as a department of the Ontario Agricultural College, is in affiliation with the University of Toronto, from which degrees will be conferred upon those who successfully complete the four years, or complete course.

The Ontario Normal School of D.S. and A. has been incorporated with the Macdonald Institute, and the chief members of the teaching staff transferred to that institution. The equipment and provision made for thorough instruction at this school nearly approaches the ideal, and every effort will be made to place it in the front rank of educational institutions for the Dominion.

In addition to the training of teachers of Domestic Science and Art, special courses are offered at the Macdonald Institute in Home Economics for those not intending to teach. A three months' course is provided in Domestic Science and Art for Public School teachers who may require a knowledge of the subject, as teachers in rural schools.

A summer school will be held for teachers of Domestic Science and Art.

Technical School, Toronto.

The Toronto Technical School offers a very complete course in Domestic Science. A graduate of Pratt Institute, Brooklyn, N.Y., is in charge of the work. One of the special objects of this school is to provide an extension course for those who have taken elementary work in public and other schools. Special courses are provided for the training of teachers, and for housekeepers.

The Lillian Massey School of Household Science.

Through the generosity of Mrs. Massey-Treble a well-equipped School of Domestic Science was established in Toronto some years ago for the purpose of training teachers, housekeepers, and children in the household arts. This school has done excellent work, and offers special inducements to those who wish to perfect themselves in household management. A graduate of Drexel Institute is in charge of this school.

Other Institutions in Which Domestec Science Receives Special Attention.

The Deaf and Dumb Institute, Belleville, has made excellent provision for a thorough training in Domestic Science. A graduate of the Ontario Normal School of D.S. and A. is in charge, and a course of study similar to that followed in the Public Schools has been adopted.

Alma College, St. Thomas; The Ontario Ladies' College, Whitby; Albert College, Belleville, and several private schools throughout the Province provide special courses in Domestic Science.

Toronto University.

The University of Toronto has established a four-years' course, leading to the degree of Bachelor of Household Science,

Equipment of Schools.

In providing an equipment for Public School classes in Domestic Science, two things must be considered, viz., order and efficiency. The time given to this work is so limited that unless instruction can be carried out promptly, much valuable time is lost. It is desirable that each pupil should have a complete set of working utensils, so as to establish a sense of individual responsibility. The former idea of pupils working in groups has been abandoned in schools where the educational value of the work is considered.

The equipments provided for the Normal Schools of Ottawa, Toronto, London, and the Normal College, Hamilton, are excellent examples of a complete, yet comparatively inexpensive, equipment for Public and High Schools.

Cost. An exaggerated idea of expense is the chief obstacle to the introduction of Domestic Science into the schools. The initial expense of equipment, which may cost from $300 to $600, according to quantity and quality chosen, is the chief item, apart from the teacher's salary. From $10 to $20 a year will cover repairs to equipments, etc., $100 to $150 a year will provide the necessary working material. Teachers' salaries are from $500 (the minimum for qualified teachers) upwards. Therefore, a centre, providing accommodation for three hundred pupils, may be satisfactorily conducted at an annual cost of $700. The classes are usually held in a school building, within easy reach of the pupils attending other schools. One classroom will accommodate two hundred and fifty pupils in ten classes of twenty-five in each, allowing two hours a week for each class. If one-and-a-half-hour lessons are given, five additional classes may be held, allowing an attendance at one centre of three hundred and fifty.

Course of Study in High and Public Schools.

In April, 1903, a Domestic Science section was organized as a department of the Ontario Educational Association. A committee was appointed to prepare a course of study for Domestic Science in the High and Public Schools, which course was submitted to the Standing Committee appointed to draft a new course of study for the schools of Ontario. The course sub-

mitted met with the approval of the Standing Committee, and the various teachers of Domestic Science have been instructed to arrange their work in harmony with the course prescribed.

Hitherto, owing to the absence of an organized standard, the work has been carried on according to the special plan of each teacher. This arrangement has not proved satisfactory, and the adoption of a graded course, with unity of work, was found necessary. In preparing the course of study the subject was considered from three points of view, that of the individual, that of the school, and that of society.

Nomenclature. Hitherto this group of studies has been discussed and treated under the title of Domestic Science, but upon the adoption of a standard course of study this title was not considered sufficiently comprehensive, and the broader and more appropriate term Home Science was unanimously adopted by the committee appointed to draft the course of study, with a hope that in future this term would be substituted for that in former use.

Home Science.—What is it? A definition of Home Science, given by a leading authority, is as follows: "A combination of household arts based on a number of sciences, and leading to the study of economics."

The chief value of such instruction lies in its power to awaken interest in matters pertaining to the home. On the principle that it is better "to idealize the real, rather than to realize the ideal," the course of study has been planned for the purpose of directing the intellectual faculties towards the idealization of the home. Every consideration has been given to the fact that the great majority of pupils requiring such instruction attend the Public School only, and while the scientific and economic phases of the question belong to the High School, the course has been so arranged as to enable all pupils to understand the principles underlying the management of a home.

Summary.

While much interest has been aroused, and remarkable progress made towards the introduction of Home Science into the schools of Ontario, much remains to be done both in extent and efficiency of work. Until the teachers of other school subjects understand the connection between Home Science and education in general, and complete correlation is established, it will be impossible to properly estimate the value of such instruction.

It is freely conceded, by the educational authorities of the United States, that Ontario has laid the best foundation for this branch of education of any country. This is due to its organization by the Department of Education on an educational basis, and the grading of the work from the elementary schools through to the University. The subject has been given intelligent recognition by the educational authorities, and provision made for its extension wherever it was necessary. The demand for qualified teachers has been in excess of the supply. Much interest has been aroused in the question of home education by the Women's Institutes of the Province. Several graduates of the Ontario Normal School of Domestic Science and Art, and graduates of the Domestic Science Schools of Toronto, have been employed by the Department of Agriculture as travelling teachers for the institutes.

The course of study now given in the Normal Schools will enable teachers in the rural schools to give elementary instruction in home science.

While an effort has been made to convey some idea of the progress made in this branch of education in Ontario through this report, it has been impossible, owing to limited space, to give the various testimonies of High and Public School Principals, Trustees and parents in favor of such instruction.

One of the most gratifying results of the introduction of this subject into the schools has been the increased interest taken in school matters by the parents, especially the mothers. Although established under difficulties, and the work necessarily experimental, the greatest satisfaction prevails wherever the studies have been introduced. With improved organization, a higher standard of work, and thoroughly trained teachers, the future homemakers of Ontario should be well equipped for their duties.

ADELAIDE HOODLESS.

January, 1904.

APPENDIX K.—STATISTICS OF

	Name of Model School.	Name of Principal.	Certificate of Principal.	Salary of Principal.	Year of appointment.	Time Principal devotes to Model School work daily during the term.	No. of assistants with first class certificat s.	No. with second class.
				$				
1	Athens	C. Ross McIntosh	I	700	1901	All day		4
2	Barrie	W. J. Hallett	I	900	1893	"		8
3	Beamsville	R. Alexander	I	600	1903	"		4
4	Berlin	J. Suddaby	I	1,150	1877	All except 2 hrs. a week	1	9
5	Bracebridge	Wm. Rammin	I	0280	1902	All day	1	7
6	Bradford	A. N. Scarrow	I	750	1902	"		3
7	Brantford	Jas. A. Underhill	I	750	1903	"	1	7
8	Caledonia	John B. Widdis	I	650	1902	"	1	3
9	Chatham	J. W. Plewe s	I	1,100	1900	"		16
10	Clinton	W. R. Lough	I	900	1884	"		6
11	Cornwall	S. J. Keys	I	920	1902	"		12
12	Durham	Thos. Allan	I	700	1888	"	1	4
13	Elora	D. T. Wright	I	*b*	1903	"	1	4
14	Forest	Jas. Campbell	I	775	1894	"		5
15	Gananoque	J. C. Linklater	I	1,000	1888	"	1	5
16	Goderich	Jas. H. Tigert	I	750	1902	"	1	8
17	Hamilton	John B. Robinson, B.A	I	950	1902	"	3	6
18	Ingersoll	H. F. McDiarmid	I	1,000	1885	"	2	9
19	Kincardine	W. B. Beer	I	800	1903	"	1	6
20	Kingston	R. F. Greenlee s	I	750	1902	"	5	15
21	Lindsay	G. E. Broderick	I	1,200	1888	"	2	18
22	London	Geo. B. Kirk	I	1,200	1900	5 hours		10
23	Madoc	T. C. Tice	I	800	1897	All day		5
24	Meaford	M. N. Clark, B.A	I	800	1899	"		5
25	Milton	Wm. F. Inman	I	780	1893	"	2	3
26	Minden	Wm. J. Stevenson	I	500	1901	"		2
27	Mitchell	J. H. W. McRoberts	I	700	1899	"	2	3
28	Morrisburg	A. E. Meldrum	I	800	1895	"		4
29	Mount Forest	G. R. Theobald	I	800	1900	"		8
30	Napanee	C. H. Edwards, B.A	I	1,000	1899	"	2	7
31	Newmarket	J. F. Harvey, B.A	I	700	1903	"	1	5
32	Norwood	R. H. Leighton	I	600	1902	"		4
33	Orangeville	W. N. Armstrong	I	800	1885	"		9
34	Owen Sound	T. A. Reid	I	1,100	1894	"		11
35	Parry Sound	A. M. Currie	I	900	1896	"	2	4
36	Perth	M. M. Jaques	I	1,000	1884	"		9
37	Picton	S. C. Woodworth	I	800	1901	"	2	7
38	Port Hope	A. A. Jordan	I	1,100	1903	"		3
39	Port Perry	R. F. Downey	I	750	1902	"	2(1B.A)	3
40	Prescott	H. W. Kerfoot, B.A	I	900	1903	"		7
41	Rat Portage	J. W. Forhan	I	900	1903	"	2	9
42	Renfrew	G. G. McNab, M.A	I	700	1903	"	1	6
43	St. Thomas	*c*Sidney Silcox, B.A., D. Paed	I	1,200	1899	"	1	10
44	Sarnia	A. Wark	I	950	1877	"	1	8
45	Simcoe	Isaac s. Rowat	I	800	1889	"	2	5
46	Stratford	*c*J. Russell Stuart	I	1,200	1887	"	1	24
47	Strathroy	Thos. Dunsmore	I	850	1882	"		9
48	Toronto	W. E. Groves	I	1,450	1895	"	1	10
49	Toronto Junction	W. Wilson	I	1,000	1889	"		25
50	Vankleekhill	A. H. Fairchild, B.A	I	720	1902	"		4
51	Walkerton	W. R. Manning	I	800	1902	"	1	7
52	Welland	David Hicks, B.A	I	600	1903	"	1	4
53	Whitby	J. A. Brown	I	950	1877	"	1	3
54	Windsor	David M. Eagle	I	1,000	1901	"	1	11
55	Woodstock	Samuel Nethercott	I	1,000	1892	"		29
	Totals	9 University graduates	55 I				47	472

a For th term. *b* Not reported. *c* Inspector of Public Schools.

COUNTY MODEL SCHOOLS, 1903.

	No. with 3rd class.	No. with other class.	Time assistant relieved Principal from Public School work daily.	Is separate room provided?	No. of volumes in professional library.	Government grant.	Municipal grant.	Fees.	No. of divisions in school or schools.	No. of divisions used for Model School purposes.	No. of students sent at one time to observe.	No. of students sent at one time to teach.	Length of time students are trained before being sent to the divisions to observe.	Length of time students are trained before being sent to the divisions to teach.
						$	$	$						
1	....	.....	All day	Yes..	140	300	150	130	5	4	6 or 7	6 or 7	4 weeks.	6 weeks.
2	....	.....	.....	"	126	150	150	140	8	8	3 or 4	3 or 4	6 "	6 "
3	....	.....	All day	"	145	150	150	105	4	4	10 or 11	5 or 6	6 "	2 mos.
4	....	.....	All except 2 hrs. a week	"	143	300	300	40	10	10	1 or 2	1 or 2	6 "	6 weeks.
5	2	.....	.....	"	150	300	.....	90	12	10	3	3	6 "	7 "
6	1	.....	All day	"	112	150	150	145	4	4	4	1	6 "	7 "
7	1	.....	"	"	119	150	250	55	9	7	2 or 3	2 or 3	6 "	7 "
8	....	.....	"	"	140	150	150	90	4	4	4 or 5	4 or 5	6½ "	6½ "
9	....	.....	"	"	403	150	150	125	16	16	3	3	2 "	6 "
10	....	.....	"	"	120	150	150	170	7	7	4 or 5	4 or 5	6 "	6 "
11	....	.....	"	"	175	150	150	140	12	11	3	3	6 "	8 "
12	1	1 B.A.	"	"	105	150	150	70	7	5	3	3	5 "	7 "
13	....	.....	"	"	128	150	150	75	5	5	3	3	6 "	6 "
14	....	.....	"	"	120	150	150	120	6	6	4	4	6 "	6 "
15	5	.....	"	"	130	150	150	35	12	6	2	2	6 "	7 "
16	2	.....	"	"	119	150	150	135	11	11	4	4	6 "	6 "
17	....	1	"	"	225	150	150	205	10	9	2	2	1 "	7 "
18	1	.....	.....	"	130	150	200	70	14	10	3	3	5 "	6 "
19	....	.....	All day	"	125	150	150	80	7	7	3	3	6 "	6 "
20	....	.....	"	"	197	150	150	150	50	23	3	3	4 "	4 "
21	....	.....	"	"	150	150	150	170	20	17	2	2	5 "	7 "
22	....	.....	"	"	97	150	545	135	10	10	3	3	4 "	2 "
23	....	1	"	"	230	150	300	135	6	6	4 or 5	4 or 5	5 "	5 "
24	1	1	"	"	101	150	150	65	8	8	3	3	6 "	7 "
25	2	.....	"	"	119	150	200	100	7	5	4	4	6 "	6 "
26	....	.....	"	"	182	150	150	25	3	3	2 or 3	2 or 3	6 "	7 "
27	1	.....	"	"	126	150	150	70	7	7	2 or 3	2 or 3	6 "	6 "
28	3	.....	"	"	130	150	150	155	7	6	6	6	5 "	6 "
29	....	.....	.....	"	130	150	150	147	8	8	3 or 4	3 or 4	5 "	6 "
30	1	.....	All day	"	200	150	150	130	10	8	3 or 4	3 or 4	5 "	5 "
31	....	.....	"	"	140	150	150	50	5	5	2	2	7 "	7 "
32	....	.....	"	"	111	150	150	165	5	5	6 or 7	6 or 7	2 "	5 "
33	1	.....	.....	"	127	150	150	95	10	5	4	4	7 "	7 "
34	....	.....	All day	"	210	150	.....	75	11	10	2	2	6 "	8 "
35	4	.....	"	"	124	300	150	95	10	6	4	4	6 "	6 "
36	1	.....	"	"	141	150	150	5	10	8	3 or 4	3 or 4	7 "	7 "
37	1	.....	"	"	250	150	150	85	10	10	2 or 3	2 or 3	6 "	6 "
38	2	.....	"	"	152	150	300	110	15	15	1 or 2	1 or 2	6 "	6 "
39	1	.....	"	"	129	150	150	100	7	7	2	2	5 "	6 "
40	....	.....	"	"	157	150	150	120	7	7	3 or 4	3 or 4	6 "	6 "
41	1	.....	"	"	15	300	.....	.....	12	10	3	3	6 "	6 "
42	....	.....	"	"	117	150	150	185	7	6	4 or 5	4 or 5	6 "	6 "
43	....	.....	.....	"	142	150	150	180	11	11	4 or 5	4 or 5	5½ "	5½ "
44	....	.....	.....	"	122	150	150	125	9	8	3 or 4	3 or 4	6 "	6 "
45	....	.....	All day	"	174	150	150	70	8	7	2	2	6 "	8 "
56	....	.....	.....	"	300	150	150	165	25	22	3	3	6 "	6 "
47	....	.....	All day	"	133	150	150	120	9	9	2 or 3	2 or 3	6 "	6 "
48	....	.....	"	"	241	150	150	100	12	11	12 or 13	12 or 13	3 "	6 "
49	....	.....	"	"	135	150	150	105	25	25	3	3	6 "	6 "
50	....	.....	"	"	95	150	150	85	4	4	4 or 5	4 or 5	6 "	7 "
51	....	.....	"	"	130	150	150	120	9	9	3	3	2 "	6½ "
52	1	.....	"	"	50	150	.....	90	5	4	4	4	6 "	6 "
53	....	3	"	"	155	150	150	45	7	7	3	3	6 "	7 "
54	1	1 B.A	"	"	121	150	150	110	14	14	2	2	6 "	7 "
55	....	.....	"	"	239	150	150	90	30	20	2	2	6 "	8 "
	34	8	.....	.....	8,227	8,850	8,585	5,792	.....	.....	.....	.....	.....	.....

APPENDIX K.—STATISTICS OF COUNTY

	Name of Model School.	Number of weeks students teach in the divisions.	Number of hours per day.	Number of classes in the divisions used for Model School purposes.	Average number of lessons taught by each student during the term.	Average number of lessons each class will be taught by all the students during the term.	Average length of each lesson.	Time students remain in a division before passing to another.
1	Athens	6 to 7	1 to 1¼	11	20	47	20 min.	1 week.
2	Barrie	7	1¼	16	20	35	16 "	1 "
3	Beamsville	3	1¾	8	16	42	20 "	1 day.
4	Berlin	6	1¾	15	24	13	25 "	1 week.
5	Bracebridge	4	1	10	18	32	20 "	3 days.
6	Bradford	6	1½	10	16	46	20 "	4 "
7	Brampton	6	⅔ to 1	14	20	12	20 "	1 week.
8	Caledonia	1½	3	4	16	72	25 "	1 "
9	Chatham	6	1	24	21	22	20 "	1 "
10	Clinton	5	1	16	20	42	20 "	3 days.
11	Cornwall	4	1½	25	28	16	20 "	2 "
12	Durham	4	1¼	12	18	21	20 "	2 "
13	Elora	5	1	11	18	24	20 "	4 "
14	Forest	6	1½	17	18	23	20 "	1 week.
15	Gananoque	6	2½	15	23	11	20 "	1 "
16	Goderich	5	1½	22	18	22	20 "	4 days.
17	Hamilton	7	4-5	150	20	5	24 "	2 "
18	Ingersoll	5	1¼	14	16	16	20 "	1 week
19	Kincardine	5	2¾	21	23	18	25 "	1 "
20	Kingston	8	1	24	23	9	20 "	4 days.
21	Lindsay	5	⅔ to 1	50	16	11	22½ "	2 "
22	London	6	1	10	20	54	20 "	2 "
23	Madoc	7	1	15	17	29	15 "	2 or 3 days.
24	Meaford	6	1½	13	22	22	20 "	3 days.
25	Milton	6	1⅔	17	20	23	20 "	1 week.
26	Minden	5	1	12	25	10	20 "	1 "
27	Mitchell	7	1¼	10	22	31	20 "	4 days.
28	Morrisburg	6	1½	14	15	37	20 "	1 week.
29	Mount Forest	6	1¼	17	22	36	20 "	2 days.
30	Napanee	6	1½ to 1¾	11	28	66	25 "	1 week.
31	Newmarket	5	1½	12	26	21	25 "	1 "
32	Norwood	5	1	11	15	45	20 "	2 days.
33	Orangeville	6	1¼	10	19	36	20 "	1 week.
34	Owen Sound	6	⅔	18	20	17	20 "	2 days.
35	Parry Souad	6	2 5-6	12	22	35	20 "	1 week,
36	Perth	7	1⅓	16	21	29	20 "	1 "
37	Picton	5	1¼	11	20	31	20 "	4 days.
38	Port Hope	6	1¼ to 1½	27	20	16	25 "	1 week.
39	Port Perry	6	1	12	25	17	25 "	1 "
40	Prescott	6	2 (3 days per w'k)	12	19	38	20 "	1 "
41	Rat Portage	6	1½	15	30	6	20 "	1 "
42	Renfrew	7	1½	8	14	65	15 "	1 "
43	St. Thomas	6	2¼	12	20	60	20 "	4 or 5 days.
44	Sarnia	7	1¼	20	24	30	20 "	4 days.
45	Simcoe	4	1	12	21	25	25 "	3 "
46	Stratford	6	1¼	62	24	12	20 "	1 week.
47	Strathroy	6	1¼	27	27	24	20 "	3 to 4 days.
48	Toronto	5	1	11	20	45	25 "	1 day.
49	Toronto Junction	6	1½	30	18	12	20 "	3 days.
50	Vankleekhill	5	2½	12	22	31	20 "	1 week.
51	Walkerton	7	1	16	20	29	20 "	3 days.
52	Welland	7	½ to 1	5	10	36	30 "	2 "
53	Whitby	6	1½	17	30	16	20 "	1 week.
54	Windsor	6	1	21	20	21	20 "	1 "
55	Woodstock	6	⅔ to 1	20	20	18	½ to ¾ hr.	4 days.
	Totals							

MODEL SCHOOLS.—Concluded.

	Number of students on roll.	Male.	Female.	Number who passed the final examination. Male.	Female.	Total.	Number with Senior Leaving standing.	Number with Junior Leaving standing.	Number with Primary standing.	Number with District Certificates.	Allowance made by trustees to Principal's assistant.	Number of renewals granted by the Board.	Average age of students.
											$		
1	26	7	19	7	19	26	.....	25	1	.....	120	1	18.8 years.
2	28	10	18	10	18	28	.....	28	.....	.....	.....	3	20.17 "
3	21	7	14	5	12	17	.....	21	.....	.....	125	3	18.2 "
4	8	3	5	3	5	8	.....	8	.....	.....	345	1	19 "
5	18	2	16	2	16	18	.....	4	.....	14	.....	9	17.75 "
6	29	7	22	7	22	29	.....	12	.....	17	125	.....	19 "
7	8	3	5	3	5	8	1	7	.....	.....	100	.....	18.5 "
8	18	4	14	4	14	18	.....	18	.....	.....	125	3	18.67 "
9	25	7	18	6	18	24	1	24	.....	.....	160	18	18.33 "
10	34	13	21	13	21	34	2	32	.....	.....	140	5	18.75 "
11	28	7	21	7	21	28	4	18	.....	6	150	15	19 "
12	14	3	11	3	11	14	1	9	.....	4	175	8	19 "
13	15	4	11	4	11	15	.....	15	.....	.....	125	1	19 "
14	22	8	14	8	14	22	2	20	.....	.....	130	.....	19 "
15	7	.....	7	.....	7	7	.....	7	.....	.....	175	1	18 "
16	27	8	19	8	19	27	4	23	.....	.....	.....	8	18.5 "
17	41	8	33	7	31	38	.....	37	1	3	.....	5	19.5 "
18	14	3	11	3	11	14	.....	14	.....	.....	.....	.....	19 "
19	16	4	12	4	12	16	1	14	1	.....	130	6	19.31 "
20	9	1	8	1	8	9	.....	9	.....	.....	.....	12	19 "
21	34	7	27	7	27	34	1	31	.....	2	.....	6	18.9 "
22	27	10	17	10	16	26	.....	27	.....	.....	250	.....	19 "
23	26	7	19	7	19	26	1	15	.....	10	140	12	19.4 "
24	13	5	8	5	8	13	.....	12	.....	1	160	1	20 "
25	20	2	18	2	18	20	2	15	.....	3	140	9	19 "
26	5	2	3	2	3	5	.....	2	.....	3	.....	10	18 "
27	14	7	7	6	5	11	1	13	.....	.....	140	.....	18.5 "
28	35	12	23	12	23	35	3	28	.....	4	75	.....	19.4 "
29	28	6	22	6	22	28	1	27	.....	.....	125	3	19 "
30	26	9	17	9	17	26	4	11	.....	11	.....	4	18.5 "
31	10	2	8	2	8	10	.....	9	.....	1	.....	4	18.7 "
32	33	6	27	5	26	31	1	24	.....	8	130	.....	18 "
33	19	4	15	3	14	17	.....	17	.....	2	120	13	19 "
34	15	2	13	2	9	11	.....	11	.....	4	.....	9	21 "
35	19	6	13	6	13	19	.....	5	.....	14	.....	15	18 "
36	22	2	20	2	20	22	2	18	.....	2	150	8	18.75 "
37	17	4	13	4	13	17	1	15	.....	1	.....	7	19.6 "
38	22	8	14	7	14	21	1	21	.....	.....	.....	7	19 "
39	8	4	4	4	4	8	1	6	.....	1	130	15	21.56 "
40	24	7	17	7	17	24	3	17	1	3	150	3	19 "
41	3	.....	3	.....	3	3	.....	2	.....	1	200	3	18 "
42	37	2	35	2	35	37	1	18	.....	18	125	30	19 "
43	36	11	25	11	25	36	2	31	.....	3	.....	8	19.08 "
44	25	7	18	7	18	25	2	23	.....	.....	.....	.....	19.24 "
45	14	5	9	5	9	14	2	12	.....	.....	160	8	19 "
46	31	8	23	6	23	29	3	28	.....	.....	.....	3	18.5 "
47	24	10	14	10	14	24	2	22	.....	.....	175	2	19.17 "
48	25	.....	25	.....	24	24	3	21	1	.....	.....	.....	19.8 "
49	21	9	12	9	12	21	.....	21	.....	.....	.....	.....	19 "
50	17	5	12	5	12	17	.....	12	.....	5	140	11	18.82 "
51	23	12	11	12	11	23	3	19	1	.....	150	3	18.75 "
52	18	.....	18	.....	18	18	1	16	.....	1	.....	8	20.5 "
53	9	4	5	4	5	9	3	6	.....	.....	.....	4	19 "
54	22	4	18	4	17	21	1	20	.....	1	210	11	19.45 "
55	18	7	11	7	11	18	.....	18	.....	.....	.....	7	19.11 "
	1,148	305	843	295	828	1,123	61	938	6	143	.....	.....	19 years.

APPENDIX L.—*PROVINCIAL NORMAL AND MODEL SCHOOLS, ONTARIO NORMAL COLLEGE.*

I. PROVINCIAL NORMAL AND MODEL SCHOOLS, TORONTO.

1. Staff of Toronto Normal School.

Wm. Scott, B.A.	Principal.
W. H. Elliott, B.A.	Vice-Principal.
A. C. Casselman	Drawing Master.
A. T. Cringan	Music Master.
Jas. H. Wilkinson	Instructor in Manual Training.
Miss Nina A. Ewing	Instructor in Household Economics.
Miss Mary E. MacIntyre	Instructor in Kindergarten Principles.
Wm. Oldright, M.D.	Instructor in Hygiene.
Mrs. Jean Somers	Instructor in Calisthenics.
Mrs. Emma Macbeth	Instructor in Needle Work.
Sergeant-Major D. Borland	Instructor in Drill.

Students Admitted, 1903.

	Male.	Female.
First Session	16	123
Session, 1903-4	3	94
Total	19	217—236

2. Staff of the Provincial Model School, Toronto.

Angus McIntosh	Head Master.
Miss M. Meehan	First Female Assistant.
R. W. Murray	First Male Assistant.
Miss May K. Caulfield	Assistant.
Miss A. F. Laven	Assistant.
Mr. Thomas M. Porter	Assistant.
Mr. Milton A. Sorsoleil	Assistant.
Miss F. M. Taylor	Assistant.
Miss A. E. G. Wilson	Assistant.
Miss Jeannie Wood	Assistant.
A. C. Casselman	Drawing Master.
A. T. Cringan	Music Master.
Miss Mary E. MacIntyre	Kindergarten Directress.
Miss Ellen Cody	Kindergarten Assistant.
Mrs. Jean Somers	Instructor in Calisthenics.
Mrs. Emma Macbeth	Instructor in Needle Work.
Sergeant-Major D. Borland	Drill Master.
Eugene Masson	French Teacher.
Jas. H. Wilkinson	Instructor in Manual Training.
Miss Nina A. Ewing	Instructor in Household Economics.

Number of pupils in 1903	533
Number of Kindergarten pupils in 1903	65

II. PROVINCIAL NORMAL AND MODEL SCHOOLS, OTTAWA.

1. Staff of Ottawa Normal School.

James F. White ..... Principal.
S. B. Sinclair, M.A., Ph. D..... Vice-Principal.
J. A. Dobbie ..... Drawing and Writing Master.
T. A. Brown ..... Music Master.
Miss E. H. Keyes, B.E..... Instructor in Elocution and Physical Culture.
Miss Eliza Bolton ..... Lecturer on Kindergarten Principles.
Miss B. Livingstone ..... Lecturer on Domestic Science.
J. S. Harterre ..... Instructor in Manual Training.

Students Admitted, 1903.

	Male.	Female.
First Session	8	114
Session, 1903-4	5	34
Total	13	148—161

2. Staff of Provincial Model School, Ottawa.

J. H. Putman, B.A..... Head Master.
J. F. Sullivan ..... First Assistant.
F. A. Jones ..... Second Assistant.
Miss M. Hope Merritt ..... Third Assistant.
Miss M. E. Butterworth ..... First Female Assistant.
Miss Florence Hanington ..... Second Female Assistant.
Miss A. G. Hanahoe ..... Third Female Assistant.
Miss J. Foster ..... Fourth Female Assistant.
Miss Eliza Bolton ..... Kindergarten Directress.
Miss J. Stocks ..... Kindergarten Assistant.
J. A. Dobbie ..... Drawing and Writing Master.
T. A. Brown ..... Music Master.
Miss E. H. Keyes, B.E..... Teacher of Physical Culture.
Miss B. Livingstone ..... Teacher of Domestic Science.
J. Fleury ..... French Teacher.
J. S. Harterre ..... Manual Training Instructor.

Number of pupils, 1903 381
Number of Kindergarten pupils, 1903 88

III. PROVINCIAL NORMAL SCHOOL, LONDON.

Staff of London Normal School.

F. W. Merchant, M.A., D.Pæd..... Principal.
John Dearness, M.A..... Vice-Principal.
S. K. Davidson ..... Drawing Master.
Fred. L. Evans ..... Music Master.
Miss Agnes Mackenzie..... Teacher of Kindergarten Principles.
Sugden Pickles ..... Manual Training Instructor.

Students Admitted, 1903.

	Male.	Female.
First Session	16	99
Session, 1903-4	6	68
Total	22	167—189

IV.—ONTARIO NORMAL COLLEGE.

Officers:

J. A. McLellan, M.A., LL.D., Principal.
R. A. Thompson, B.A., Vice-Principal.

Faculty:

J. A. McLellan, M.A., LL.D. ..... Professor of Education.
R. A. Thompson, B.A. ..... Lecturer on School Management.
J. B. Turner, B.A. ..... Lecturer on Methods in Chemistry, Botany and Zoology.
J. T. Crawford, B.A. ..... Lecturer on Methods in Mathematics.
W. M. Logan, M.A. ..... Lecturer on Methods in Classics.
E. S. Hogarth, B.A. ..... Lecturer on Methods in Modern Languages.
F. F. Macpherson, B.A. ..... Lecturer on Methods in Literature and Composition.
S. A. Morgan, B.A., D. Pæd. ..... Lecturer on Methods in English Grammar and Rhetoric.
A. Paterson, M.A. ..... Lecturer on Methods in History and Geography.
J. Gill, B.A., B. Pæd. ..... Lecturer on Methods in Physics.
Agnes Knox-Black ..... Lecturer on Reading and Elocution.
J. C. McCabe, M.D. ..... Lecturer on School Hygiene and Sanitation.
G. L. Johnston, B.A. ..... Lecturer on Writing and Drawing.
M. C. Macpherson, B.A. ..... Domestic Science Instructor.
W. Bailey ..... Manual Training Instructor.
J. Johnson ..... Music.
T. E. Parkhill, Sergt. ..... Drill, Gymnastics and Calisthenics.

Students Admitted, Session, 1903-4.

Male	37
Female	90
Total	127

APPENDIX M.—*HIGH SCHOOL CADET CORPS*, 1903.

Name of School.	Number of N. C. Officers and boys in the Corps,	Drill.	Remarks of Militia Officers.
Arthur	29	Good	For a company only organized recently they made an excellent showing. Both the principal and instructor are enthusiastic and are receiving support from the trustees.
Barrie	34	Good	A satisfactory report.
Brantford	37	Good	A very satisfactory report.
Chatham	42	Very good....	They are all uniformed in this company and present a good appearance in khaki. Instructor very good, but apparently handicapped by want of interest taken by principal.
Cobourg	40	Good	A satisfactory report.
Collingwood ..	32	Good	A satisfactory report.
Dundas	25	Fair	Fairly satisfactory. Six boys absent on account of measles.
Dunnville	26	Fair	Fairly satisfactory.
Galt	38	Excellent	An excellent company in every respect, with good instructors and a principal who takes an interest.
Goderich	39	Very good....	This company presented a good appearance in khaki and straw hats. Several members were absent in camp. The junior company was on parade at marine uniform.
Guelph	59	Good	A very good company under a good instructor; strong in numbers; regret did not take up musketry this year.
Hamilton	36	Good	Very satisfactory report.
Lindsay	42	Good	Satisfactory report.
London	27	Indifferent ...	A very unsatisfactory inspection. There is a want of enthusiasm in the school which cannot be accounted for. A very bad report.
Markham	39	Good	Satisfactory.
Morrisburg	35	Very good	A satisfactory report.
Mount Forest .	46	Very good.....	This company is well drilled and takes great interest in shooting and work generally. The instructor is first rate and very keen about his corps. One defective rifle.
Napanee	42	Very good.....	A satisfactory report.
Niagara Falls	25	Fair	Sickness accounts for small attendance. A satisfactory report.
Norwood	25	Good	A satisfactory report.
Orillia	31	Fair	Satisfactory.
Ottawa	.....	.....	(No report.)
Owen Sound ..	46	Very good.....	A very satisfactory report.
Peterborough	37	Good	A satisfactory report.
Petroea	22	Fair	This company being inspected on Saturday, very few boys were on parade. They had been drilled but knew nothing of skirmishing. There is a lack of interest in this corps.
Port Perry	30	Fair	A satisfactory report.
Ridgetown	28	Fair	Only just organizing; will be a good company.
St. Catharines	31	Good	Satisfactory.
St. Thomas ...	51	Excellent ...	By far the best company in the district. They are almost perfect in all details, owing to the interest taken by the principal and the invaluable work performed by the instructor.
Seaforth	43	Fair	This company was badly dressed, there being no uniformity. Instructor no tvery enthusiastic and principal apparently takes no interest.
Strathroy	40	Very good....	A very good company with an enthusiastic instructor. The principal takes a great interest
Toronto—			
Harbord St..	44	Good	Satisfactory.
Jameson Ave	36	Very good.....	Very satisfactory
Jarvis St....	43	Very good.....	Satisfactory.
Uxbridge	29	Good	Satisfactory.
Vankleekhill ..	29	Good	A satisfactory report.
Woodstock	35	Excellent	An excellent corps with an excellent instructor and a principal who encourages the corps.

THE BECK SHIELD.

Colonel Peters, D.O.C., Military District No. 1, reports that, in the musketry competition for the shield presented by His Worship, Mayor Beck, to the School Corps of Military District No. 1, the following scores were made:

The result was a "win" for the St. Thomas Cadet Corps, with the fine score of 149 out of a possible 200 heads.

Last year it was won by Mount Forest.

School.	Score.	Umpire.
Woodstock	99	Capt. Uniacke.
Arthur	51	Capt. Campbell.
London	96	Major MacQueen.
Strathroy	119	Capt. Layborn.
Goderich (retired)		Capt. Coombe.
St. Thomas	149	Capt. Kingsmille.
Mount Forest	120	Capt. Smith.
Galt	75	Col. Peters.
Chatham (retired)		
Seaforth	100	Capt. McTaggart.

Teams of twenty boys each.

APPENDIX N.—*SUPERANNUATED TEACHERS.*

(Continued from Report of 1902.)

*1. Allowances Granted During 1903.

Register number.	Name.	Age.	Post Office.	Years of service.	Allowance.
					$ c.
1112	Smith, Abraham B.	60	Stratford	40½	282 50
1113	Robertson, Gavin E	55	Perry Station	14½	101 50
1114	Pollock, James E.	54	Ravenshoe	4	28 00
1115	Cochrane, John G.	54	Jerseyville	35	245 00
1116	Gray, John	63	Beeton	8½	59 50
1117	Cull, Frederick A	52	Guelph	29½	204 00
1118	Hall, Richard D.	60	Kincardine	40½	283 50
1119	Husband, Henry	67	Oakville	42½	297 50
1120	†Alexander, Robert	70	Galt	48½	339 50
1121	†Smith, David	50	Hepworth	25½	171 50
1122	†Mills, David	63	Bayview	32	220 50

2. Summary for Years 1882-1903.

Year.	Number of teachers on list.	Expenditure for the year.	Gross contributions to the fund.	Amount refunded to teachers.
		$ c.	$ c.	$ c.
1882	422	51,000 00	13,501 08	3,660 10
1887	454	58,295 33	1,489 00	3,815 80
1892	456	63,750 00	1,313 50	786 86
1897	424	62,800 33	847 00	620 27
1902	407	64,244 92	1,073 50	722 78
1903	398	63,267 43	996 00	470 25

Eight teachers' subscriptions were withdrawn from the fund during 1903.

* As the sum of $4 is deducted from each Superannuated Teacher's allowance, as subscription to the fund, the payments were $4 less in each case than given above.

† Allowance commences with 1904.

APPENDIX O.—*LIST OF CERTIFICATES ISSUED BY THE EDUCATION DEPARTMENT, 1903, ETC.*

1. Public School Inspectors.

Anderson, William George, B.A.
Christie, Duncan M., B.A.
Elliott, Thomas, B.A.
Fletcher, William Hugh, M.A.
Gill, James, B.A., B. Pæd.
Hedley, William Powell, B.A.
Keillor, James, B.A.
Knox, Robert Hunter, B.A.
MacDonald, George Leslie, B.A.
McKay, Donald A., B.A.
Morgan, John James, B.A.
Morrison, A. Selkirk, B.A.
Newcombe, Abram Cooke, B.A.
Reed, George Henry, B.A.
Smith, Arthur, B.A.
Stevenson, Orlando John, M.A., D. Pæd.
Voaden, John, B.A.
White, Robert Oliver.

2. High School Principals and Specialists.

Anderson, Frank Cecil, B.A. (Science)
Anderson, William George, B.A. (Classics)
Armstrong, William Gilnochie, M.A. (Moderns and History)
Carter, Elsie, B.A.
Downey, Helen Elizabeth, B.A. (Moderns and History)
Dunkley, Albert Wesley, M.A. (Classics)
Fletcher, William Hugh, M.A. (Commercial)
Hedley, Robert Wesley, B.A. (Mathematics)
Keillor, James, B.A. (English and History)
Kerfoot, Horace Watson, B.A.
Kemp, William, M.A. (Moderns and History)
MacLean, Allan Edmund, B.A. (French and German)
McKay, Donald Alexander, B.A. (Science)
McPherson, Hattie Georgina, B.A. (Moderns and History)
Marshall, John Wells, B.A. (Classics)
Morgan, Joseph, B.A. (Science)
Morrison, A. Selkirk, B.A. (English and History)
Newcombe, Abram Cooke, B.A. (Classics)
Overholt, Arthur Milton, B.A. (Mathematics)
Pearson, Alexander, B.A. (Science)
Preston, Thomas, B.A. (Science)
Race, Wilfred B., B.A.
Robertson, George D., B.A.
Saunders, William John, M.A. (Science)
Sexton, James Henry, M.A. (Science)
Smith, Arthur, B.A. (Science)
Voaden, John, M.A.
Ward, William, B.A. (Commercial)
Wren, John Stewart, B.A. (Mathematics)
Wright, William Jonathan, B.A. (Classics)

3. High School Assistants and Specialists.

Asselstine, Robert Whiting, B.A.
Black, Harvey H., M.A. (Classics)
Blain, Maud E.
Buchner, Claribel M.
Deroche, Eleanor Elizabeth, B.A. (Classics)
Dickenson, James Arthur, (Commercial)
Dobson, Perceval Charles, B.A. (Classics)
Dolan, George Robert, B.A. (Classics)
Downing, John Henry.
Elliott, Robert Leopold.
Elmslie, Wallace, B.A. (Moderns and History)
Foster, Jessie (French and German)
Guest, Emily Jane, B.A.
Hamilton, William John
Hawkins, Maud Mary, B.A.
Jackman, David S., B.A. (Science)
Kirkwood, Florence Ethel, B.A. (Classics)
Lick, Addie, B.A. (Mathematics)
MacDougall, Graham, B.A. (Classics)
McBride, Sara
McDonald, Wilbert L.
McKay, Donald Alexander, B.A. (Science)
Munro, Peter Fraser, B.A. (Classics)
Reynar, Marianne Beatrice, B.A., (Moderns and History)
Scratch, Linnie May (Commercial)
Tennant, Isabella Leathern
Whitely, Lester Robert, B.A. (Moderns and History)

4. Summary of Public School Teachers' Certificates.

	Male.	Female.	Total.
First Class	37	43	80
Second Class	31	342	373
Third Class, per County Model School reports	295	828	1,123
Plantagenet bi-lingual Model School	3	17	20

5. First Class Certificates.

Anderson, Lillie C.
Bloor, Walter Roy, M.A.
Blyth, Sara
Bell, M. F. Winifred
Clark, Ira E.
Church, George Alexander
Carling, Evelyn
Card, Margaret
Calder, Jessie Elizabeth
DeCow, Nellie, B.A.
Downey, Rossa Fred.
Dickenson, Edgar Unwin, B.A.
Delmage, Edith Rachel, B.A.
Easson, McGregor
Elliott, Leslie C.
Evans, Winifred
Elmslie, Kate
Flower, John
Fox, Catherine H. C., B.A.
Fuller, Ernest L.
Finley, Samuel
Fowler, Dell.
Gaut, Robert
Graham, Robert Radie, B.A.
Grant, Alexander William, B.A.
*Gray, Neil Roy, B.A.
Gilmour, Allan
Good, Clara Louisa
Hampson, Edward
Harvey, John Franklyn, B.A.
Holladay, Nellie
Hubbard, Joseph J.
Jackson, Janetta Estella
Jamieson, Mabel Clare
Kerr, Francis Ernest
*Lang, Hector, B.A.
Laur, Waldon
Lawrence, Ira A.
*Lougheed, William James, B.A.
Mark, Alfred E.
Merry, Sophie
Morden, Frances
Mitchell, A. Eva
Meldrum, George Edward
McGuire, James, M.A.
*McKerricher, D. Arthur, B.A.
McLean, Christine L.
McDonald, John Cameron
McCallum, Margaret Ross
Norton, M. Maud
Norton, Ida
Norton, Mabel Emma
O'Brien, William James
Parr, Sarah E.
Pope, Amy
Prior, Arthur Edward
Patterson, Ethel Hume
Richardson, Walter L. C.
Roddick, Roderick
Rozel, John Melvin
Rumble, Isaac A., B.A.
Rorke, Louise
Rutherford, Viola Wilhelmina
Robertson, Edith Bray
Rioch, Grace Margaret
Strachan, Dan. L.
Summers, Gilbert
Stewart, Christina
Sinclair, Margaret
Sutherland, Jennie
Shepard, E. Estelle
Tupling, Minnie
Tremeer, Hattie Maud
Thomson, Helen M.
Taylor, Daisy E.
Timberlake, Alice E.
Urquhart, John, B.A.
*Wilson, M. Grace Evelyn
Wilson, Rose M.
Walker, Edith B.

* Honors.

6. Second Class Certificates.

(a) *Toronto Normal School, June 1903.*

Abraham, Mary Buelah
Anderson, Mary Emma
Armstrong, Catherine H.
Baird, Lizzie
Barnett, Julia C.
Beath, Ethel Irene
Beatty, Mabel Anna
Bell, William James
*Birch, Rhoda Amelia
Bradley, Helen Grace
*Brown, Edith Jane
Browne, Martha
Bush, John Augustus
Campbell, Bessie B.
Campbell, Edith Helen
Campbell, Olivia
Cane, Emma Francis
*Carlton, Lizzie
*Carter, Gertrude E.
Carter, Mabel Helen
Cassin, Maud Mary
*Caton, Lilian Pearl
Cheffins, Florence
*Christian, Constance H.
Clark, Alberta Miranda
Clark, Annie Ethel
Clark, Margaret H.
*Clark, Lissa
Clarke, Blanche Mary
Collar, Ella
Collard, Ethel Rae
*Comfort, Elwood M.
Cooper, Eva Mary
Darroch, Laura Jean
Davidson, Annie H.
Davis, Emma Jane
Dayfoot, Charlotte H.
Deans, Margaret J.
Doyle, Annie E.
Dunham, Bertha M.
Elliot, Marjorie B.
Evans, Ella Victoria
Feasby, William James
*Ferguson, Tena May
Fife, Jennie Cecelia
Filson, Margaret J.
Forfar, Janie
Galbraith, Flora M.
*Geddes, Agnes
*Gesner, Ada Marie
Gibbons, Maggie E.
Glendinning, Lissa
Gray, Ada
Griffith, Julia Emma
Hamilton, Sadie A.
Haney, Catharine A.
Hanna, William E.
Hartry, Maud Mary
Hazlett, Millie E.
Henderson, Alice
Hobson, Maud
Howard, Margaret E.
Hunt, Margaret L.
Husband, Isabel R.
Hutchinson, Susan H.
*Joblin, Frederick George
Kirk, William Fred.
Knoll, Jacob John
Langman, Eva E.
Legge, Ethel
Madill, Albert E.
Magee, Ethel S.
Mann, Minnie E. F.
Martin, Harold
Mathews, Evelyn
Maus, Daisy Marion
May, Clarence R.
Moore, Helen
Moulton, Edith May
Munsie, Pauline
Murray, Jean Isabel
Macpherson, Florence
Macpherson, Jessie G.
MacVannel, Elizabeth
McCormack, Ethel W.
McDougall, Jennie V.
McDowell, Margaret
McGorman, Lilly M.
McIntyre, Mary E.
McKenzie, Harriet Y.
McKinlay, Lila
McQuid, Myrtle E.
Nesbitt, Mamie
Oliver, Kathleene Louise
O'Neil, Emma
Owens, Minetta
Perkins, Nellie
*Petch, Samuel Saunders

* Honors.

(a) *Toronto Normal School, June, 1903.—Con.*

Phillips, Reginald W. J.
*Plenderleith, Eliza
Reid, Eva May
*Richardson, Dora M.
*Rickard, Mabel R.
*Ritchie, Minnie
Roberts, Evelyn Sarah
Ross, Mary Elsie
Ruston, Adeline
Saunders, Ethel S.
*Scott, Clara Rebecca
Scott, Ida
Scott, Maggie Jane
Scott, Jennie Georgina
Scott, Pearl Harmena
Shaw, Oscar
Sherwood, Herbert D.
Shunk, Carrie
Simpson, Katie E.
Simpson, Alice M.
Sloane, Robert Duncan
Smellie, Alice Jane
Smith, Belle Mary
Steele, Gertrude
Strathearn, May
Taylor, Phyllis Rosella
*Thompson, Annie M.
Thorp, May
Wakeley, Dorothea
*Walker, Minnie Robertson
Ward, Bessie R.
Wass, Ida May
Watson, Elinor Lorena
Waugh, Isabel H.
Weatherston, Elspeth
White, Jessie May
Widdifield, Ethel A.
*Williamson, Mabel L.
*Wilson, Agnes A.
*Wood, Ethel May
Wynes, Ida

(b) *Ottawa Normal School, June, 1903.*

Adams, M. Gertrude
Airth, C. Ethel
Anderson, Alice M.
Asseltine, Gretta
Barclay, Elizabeth
Bartley, Hattie M.
Bates, Emma Jean
*Beattie, Ina G.
*Bedford, Bertha H.
Bell, Jessie
Benning, Alice Marie
Best, Ella May
Boyd, Julia M.
Broadworth, I. Alma
Broadworth, Nora V.
Brown, Mary F.
Campbell, Christine
Campbell, Elsie
Campbell, Helena
Cardiff, Mamie I.
Cauley, Tena A.
Clint, E. Etta
Coakwell, Alice G.
Coleman, Donald H.
Collins, Christina E.
Cook, Ethel L.
Coughlan, Cassey V.
Coulter, Ella
Crookshanks, Eva S.
Curtis, Clara M.
Dalrymple, Mary A.
Dewar, Rachel F.
Doan, Mina
Douglas, Etta L.
Eagan, Katie
Elliott, Anna May
Ellis, Richard J.
Farrell, Gertrude
Farrey, Lenore
Ferguson, Christianna
Ferguson, Cora B.
Fisher, Cora R. L.
Fodey, Rose
Foster, Isabel
Frayn, Annie N. L.
Gallagher, Elsie
Gardiner, Margaret
Gavin, Laura M.
Gibson, Mary E.
Glossop, Margaret
Gorman, Gertrude
Graham, Williamina J.
Hazelton, Lizzie
Heenan, Cleta A.

* Honors.

(*b*) *Ottawa Normal School, June, 1903.—Con.*

Helyar, E. Olive
Hicks, Ethel A.
Hicks, Thomas J.
Hunter, Jennie C.
Ingoldsby, Margaret
Johnston, Annie F.
Jones, Gertrude
Jordon, Maggie J.
Jose, Walter G.
Kincaid, Emma P.
Laventure, Lydia R.
Little, Margaret G.
Mahoney, Mamie
Martin, Annie H.
Martin, Laura E.
*Massecar, Ethelyn
Menzies, Edith
Merkley, Stella M.
Moffat, Maude E.
Murray, Agnes G.
MacCracken, Annie L.
MacIntyre, Gertrude
MacKay, Lily I.
MacKenzie, Annie C.
MacKenzie, Margaret
MacNaughton, Eunice
MacNaughton, May
McCall, F. Stacey
McCully, Mary
McDonald, Mary J.
McKenny, Louise
McKenty, Mary Claire
McKian, Katy
McLaren, Lizzie
*McLean, Pearl L.
*McNeill, Roberta
McPherson, Mabel
Nelson, Florence
Ogram, Jennie
Oulton, Llewella
*O'Connor, Loretto
Paterson, Mary
Pierce, May A.
Price, Maud
Reeves, Minnie
Richards, Emily E.
Roberts, Erie E.
Robertson, Florence
Rush, E. Louisa
Shaw, Christie
Skitch, Carrie
Slattery, Annie A.
Smith, Henry Lloyd
*Smith, Wilfrid D.
Speer, Tilda
Taylor, Mary H.
Walter, Annie
Walton, Mary C.
*Ward, Ada L.
*Ward, Ethel E.
Warrington, M. Saretta
Watson, Annie
Whyte, Jean C.
Wright, S. Amy
York, Victor D.
Young, Leila

(*c*) *London Normal School, June, 1903.*

Abbott, Georgie B.
Allan, Marion I.
Angus, Bella
Arthurs, William Thos.
Ballantyne, Annie
Bartlett, Olive
Bee, Ethel
Bell, Agnes
Bowman, Annie
Buckle, Mable C.
Burns, Carrie
Burns, Hattie I.
Burtch, Orrie
Campbell, Kate S.
Campbell, Tina
Carter, Eva Elmina
Chambers, Blanche
Clarke, George Wesley
Cook, George James
Cooper, Mary E.
Cornish, Jessie
Coulson, Hattie
Cowan, Alice O.
Dart, Alma S.
Delyea, Nettie
Dickie, Margaret
Douglas, Lily Marian
Doyle, Annie M.
Fair, Edith
Fair, Maud

* Honors.

(*c*) *London Normal School, June, 1903.—Con.*

Flynn, Annie
Gammon, Gertrude E.
Hall, Morris F.
Hamilton, Louise M.
Hay, William E.
Henry, George E.
Hickey, Margaret
Hill, Abbie
Hipwell, Mary
Holcombe, Maggie
Hudson, George E.
Hunter, Eva A.
Hulton, Nellie
Ireland, Abbie
Johnston, Gordon Elwood
Knowles, Edith
Lamb, Theresa
Lawrence, Jessie
Lee, Rose H.
Lewis, Sarah J.
Livingstone, Hana
Livergood, Mary M.
Logan, Maggie
Long, Harry Richard
Lorimer, Isabella
Matheson, Annie
Mauthe, E. Ethel
Miles, Winnifred
Milne, Winifred C.
Moffat, Isabel
Morgan, Jennie M.
Mortimer, Fanny
Mossip, Maggie
Murray, Lulu
*MacKellar, Annie E.
McCaughrin, Jean
McKutcheon, Georgina
McFarlane, Christena
McIntyre, Christena
McIntyre, Mary
McKay, Mabel Hettie
McKenzie, Bessie C.
McKenzie, Christie A.
McKinlay, Maggie
McKnight, Carrie
McLean, Amy L.
McMillan, Grace
McMillan, Jennie S.
Nichols, George C.
Nichol, Mary S.
Norris, Donald A.
Notman, Elizabeth
Olivant, Margaret E.
Paterson, Mary L.
Peterson, Alice
Plante, Clare
Presswell, Ruth E.
Price, Isabel
Rilter, Charles Edgar
Roberts, Maude
Rolston, Jessie A.
Ryan, Mabel Cecelia
Salvadge, Ethel
Saton, Maud
Sheppard, Jessie F.
Soper, Jessie
Sparling, Olive May
Spence, Ethel M.
Stewart, Peter S.
Taylor, Bessie
Thompson, Wilhelmene
Thomson, Bessie M.
Tovell, H. Ethel
Wanless, Violet
Watts, Albert C.
Weber, Daniel
Welsh, Margaret H.
Werrell, Maud
Westman, John A.
White, Amy Florence
Williamson, James D.
Wilson, Elizabeth G.
Wilson, Mary E.
Zink, Ella J.

(*d*) *Second class certificate granted under Sub-section 8, Section 4, cap. 291, R.S.O. 1897.*

Freeman, Alberta S.

* Honors.

7. Kindergarten Directors.

*Allison, May
Breading, Annie
Chapman, H. Lorena
Green, Matilda
Howie, Ethel B.
Hendry, Mary Diana
Harris, Isabel Helen
Leavens, Ethel May
Lawrence, Allie Dee.
Manly, Laura E.
Meek, Gertrude
McAuley, Adelaide
McIlwain, Mabel
*Copus, A. Winnifred
Cornell, M. Gertrude
Drew, Annie
McLeod, Helen B.
Patterson, Frances E.
Platt, Ethel
Robb, Alma F.
Rogers, Helen
Rogers, Edith L.
Walker, Florence May
Wilson, Jennie H.
Westman, Hariet
White, Mary A.

8. Kindergarten Assistants.

Baker, Mildred A.
*Brooker, Rosalie Alice
*Ballachey, M. E. G.
*Brown, Ruth E.
*Broadbent, Mildred
*Cleaver, Mona H.
*Cunningham, Mabel Lindsay
*Daly, Georgina J.
*Denne, Edith May
*Feer, Euphemia
*Goulding, Lillian G.
*Howell, Edna F.
Kidney, Ethel S.
*Lennox, Eleanore G.
*McVety, Spray L.
*Martin, Georgina
*Mabee, M. Edna
*Parker, Winnifred S.
Robinson, Jean N.
*Robinson, Nora
*Schaumberg, Alice Maud
*Sherring, May E.
Sutherland, Jessie
*Taylor, Alethea M.
Turner, Mildred
*Willson, Mary B.
*Watson, M. Edith
*Woods, Mamie McF.
*Wilson, Belle
*Widsor, Ellen May
*Yellowlees, Florence E.

9. Certificates in Domestic Science.

Cooke, Margaret E.
Coleman, Maud
Delaparte, Marie A.
Derbishire, Kate E. (sewing only)
Ewing, Nina A.
Fisher, Katharine A.
Hills, J. J.
Jackes, Margaret
McMillan, Margaret
MacDonald, Edith W.
MacLeod, Ethel
MacNachtan, Ethel R.
Mongan, Catharine
Murray, Isabel
Payne, Lillian J.
Roddick, Jeanie M.
Simpson, Mary
Wigle, Cora J.

* Honors.

10. Temporary and Extended Certificates.

County, etc.	Temporary certificates.	Third Class certificates extended.	County, etc.	Temporary certificates.	Third Class certificates extended.
Bruce	20		Norfolk	3	
Carleton	1		Ontario		1
Dufferin	2	1	Peterboro'	11	
Essex	6		Prescott and Russell	9	1
Frontenac	11		Renfrew	29	2
Glengarry	14		Simcoe		2
Grey	1		Stormont	4	
Halton	1		Victoria	4	
Hastings	10		Western Ontario R.C.S. Schools	4	
Kent	3	1	Central " " "	6	
Lambton	9		Eastern " " "	7	6
Lanark	16	2	Districts	82	5
Leeds and Grenville		1	Totals, 1903	292	23
Lennox and Addington	3	1	" 1902	307	58
Middlesex	6		Decrease	15	35

11. Professional Examinations.

	Kindergarten Assistants.	Kindergarten Directors.	Co. Model Schools.	Normal Schools.	Normal Colleges.
No. of candidates	32	33	1,148	378	149
No. who passed	30	25	1,123	373	138
No. of appeals	1	5		2	3
Appeals sustained	1	1		2	3

APPENDIX P.

MEMBERS OF THE EDUCATIONAL COUNCIL AND BOARDS OF EXAMINERS; LISTS OF ASSOCIATE EXAMINERS, AND HIGH SCHOOL PRINCIPALS AND ASSISTANTS.

I.—Educational Council, 1903-1904.

Prof. James Loudon, M.A., LL.D., President, Toronto University.
Prof. Maurice Hutton, M.A., Principal, University College, Toronto.
Prof. A. B. MacCallum, B.A., M.B., Ph.D., Toronto University.
Prof. Alfred Baker, M.A., Toronto University.
Rev. J. R. Teefy, M.A., LL.D., Principal, St. Michael's College, Toronto.
Rev. N. Burwash, M.A., LL.D., Chancellor, Victoria University, Toronto.
Prof. A. P. Knight, M.A., M.D., Queen's University, Kingston.
Rev. Prof. Clarke, M.A., D.C.L., F.R.S.C., Trinity University, Toronto.
Rev. O. C. S. Wallace, M.A., D.D., LL.D., Chancellor, McMaster Uni., Toronto
R. H. Cowley, Esq., M.A., Inspector of Schools for Carleton Co., Ottawa.
F. C. Colbeck, Esq., B.A., Principal, Coll. Institute, Toronto Junction.
David Young, Esq., Principal, Public Schools, Guelph.

II.—Boards of Examiners, 1904.

(1) District Certificate Board.

W. Mackintosh, I.P.S., Madoc
S. Phillips, B.A., I.P.S., Minden
H. I. Strang, B.A., Goderich
W. W. Rutherford, B.A., Aylmer
D. Robb, B.A., I.P.S., Brussels

(2) High School Leaving and University Matriculation Board.

P. Toews, Ph.D., Toronto University
A. Carruthers, M.A., Toronto University
W. J. Alexander, Ph.D., Victoria University, Toronto
J. Fletcher, LL.D., Toronto University
F. B. Allan, Ph.D., Toronto University
L. E. Horning, Ph.D., Victoria University, Toronto
J. McLennan, Ph.D,. Toronto University
J. C. Robertson, M.A., Victoria University, Toronto
M. A. Mackenzie, M.A., Trinity University, Toronto
W. S. W. McLay, B.A., McMaster University, Toronto
M. O'Brien, Separate School Inspector, Peterboro'
A. T. DeLury, M.A., Toronto University
B. A. Bensley, Ph.D., Toronto University
W. Pakenham, B.A., Toronto
R. S. Jenkins, M.A., Trinity University, Toronto

(3) Commercial Specialist Board.

J. H. Packham, B.A., Owen Sound
G. L. Johnston, B.A., Hamilton

(4) Kindergarten Board.

Miss A. McKenzie, Normal School, London
Miss L. M. Currie, Toronto
S. A. Morgan, D. Pæd., Hamilton
Miss E. Bolton, Normal School, Ottawa

(5) Normal College Board.

O. J. Stevenson, M.A., D. Pæd., St. Thomas
H. G. Park, M.A., D. Pæd., Uxbridge
C. A. Mayberry, B.A., Stratford
A. Mowat, B.A., Brockville
R. A. Little, B.A., London
W. Hardie, M.A., Perth
S. J. Radcliffe, B.A., London
A. E. Jewett, B.A., Chatham
W. J. Sykes, B.A., Ottawa
S. Martin, B.A., St. Mary's
I. J. Birchard, M.A., Toronto
Miss J. Carter, B.A., Galt
H. McKellar, B.A., Owen Sound
G. F. Rogers, B.A., Seaforth

(6) County Model School Board.

A. McMillan, Toronto
A. McIntosh, Toronto
W. Scott, B.A., Principal Normal School

(7) Art School Board.

A. H. McBride, Toronto
Gustav Hahn, Toronto
A. C. Casselman, Toronto
Mr. Allward, Toronto
T. A. Reid, Owen Sound
Miss J. C. McRae, Belleville
J. Lang, Toronto
A. C. Barrett, Toronto
A. F. McCallum, Toronto
McGillivray Knowles, Toronto
F. S. Challener, Toronto

(8) High School Entrance Board.

I. M. Levan, B.A., Woodstock
J. D. Dickson, B.A., Niagara Falls
T. A. Craig, I.P.S., Kemptville

III.—Associate Examiners for Departmental Examinations, 1903.

(1) District Certificate Examination

Arithmetic

Caverhill, A. E.

Geography

Currie, A. M.
Milne, J. W.

English Grammar

McIntosh, Angus
Young, D.

English Composition

Chapman, W. F.
Barr, Lydia A.

History

Sparks, W. F.
Sorsoleil, M. A.

(2) Junior Leaving

Classics

Caesar, L.
Jackson, W. S.
Jones, G. M.
Kirkwood, Florence
Luton, J. T.
Robinson, J. P.
Riddell, F. P.
Sawers, F. J.
Stoddard, R.
Stubbs, S. J.
Will, G. E.
Wilson, N. L.
Wright, Miss L.

Experimental Science, Chemistry and Physics

Anderson, G. R.
Smellie, W. K. T.

Chemistry

Cozens, A.
Donaldson, W.
Kirkland, W. S.
Knox, R. H.
McCready, S. B.
Morgan, J. J.
Young, W. D.

Physics

Carefoot, G. A.
Carr, W. R.
Clark, H. J.
Gill, J.
Ivey, T. J.
Lehmann, C.
McDougall, N.
Reid, M. R.
Stuart, F. A.
Thompson, R. B.
Thompson, P. M.

French and German

Allin, Elizabeth A.
Brown, W. H.
Carter, Janet
Clayton, Adelaide
Clothier, J. G.
Denyes, J. M.
Gardiner, Ella
Jones, Laura
Marty, Sophie E.
MacDougall, Miss I. J.
MacLean, Allan E.
Tennant, Isabel
Weir, Annie

History

Carstairs, J. S.
Dandy, W. P.
Deroche, Eleanor E.
Findlay, W. A.
Foster, Jessie
Hinch, N. E.
Marshall, J. W.
McLean, W. I.
McMurchy, R. D.
McVicar, A.
Oliver, E. H.
Stothers, R.
Thompson, J. F.

English Composition

Ball, Kathleen
Forbes, W. B.
McPherson, Hattie G.
Morrison, Amy
Mowat, A.
Rose, Marion
Ross, R.
Skinner, Kate C.

III.—Associate Examiners for Departmental Examinations.—*Concluded.*

(2) Junior Leaving.—*Continued.*

English Grammar

Dobson, P. C.
Downey, Helen
French, B.
Gibbard, A. H.
Hardy, E. A.
Hawkins, Maud
Henstridge, Eliza
Keillor, J.
McKay, D.
Pattee, Ada (Mrs.)
Robeson, W. R.

English Literature

Asman, H. O. E.
Barr, Janet
Eliott, T. E.
Foik, H. J.
McCool, J.
MacDonald, Jean
MacDonald, Helen
Meiklejohn, A. J.
Morrow, J. D.
Mowbray, W.
Nichols, Bessie H.
Phelps, Frances
Sykes, W. J.
Thompson, Margaret

Euclid

Brown, P. W.
Colling, G. F.
Cox, J. L.
Frost, F. H.
Forbes, J. W.
Harvey, Martha A.
Kirkconnell, T.
Merritt, R. N.
Myer, A. N.
O'Connor, W.
Rudlen, G. W.
Tier, W.

Algebra

Anglin, R. W.
Doidge, T. C.
Hedley, R. W.
Martin, S.
Massey, A. W.
McPhail, A. C.
Whyte, R.
Wooster, Thyrsa

Arithmetic

Bell, Ethel
Davison, J.
McDougall, J. B.
Nicholl, W. W.
Norris, L. T.
Powell, E. G.
Robertson, G. D.
Simpson, R. S.
Strath, R. S.

(3) Senior Leaving

French and German

Albarus, Hedwig S.
Bunnell, Effie
Clark, D. K.
Lane, J. S.
Van Every, J. F.

Classics

Bragg, T. G.
Brown, L.
Croskery, R. A.
Jolliffe, R. O.

Science

Piersol, W. H.
Scott, F. H.
Whyte, D.

Mathematics

Burton, F.
Murray, T.
Overholt, A. M.
Rand, W. E.
Rutherford, W. W.
Stanley, T. E. A.

History

Gundy, H. W.
Howard, E. S.

English Literature and Composition

Charles, Henrietta
Christie, J. D.
Dingle, Grace
Field, J. M.
Walks, R. H.

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.

Collegiate Institutes.	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
Aylmer	Rutherford, Walter W	B.A., Tor	Math	1883	1,400
	Kilmer, Ernest E. C		Commercial (Interim) Sci	1899	900
	Hawkins, Maud Mary	B.A., Tor	Eng., Hist., Fr., Ger	1903	600
	Munro, Peter Fraser	B.A., Queen's	Class	1903	700
Barrie	Redditt, Thomas H	B.A., Tor	Eng., Hist., Fr., Ger	1893	1,500
	Hay, Andrew		Math	1882	1,000
	Minns, James Edward	B.A., Vic	Math., Sci	1893	1,000
	Moir, Mary Annie		Commercial	1895	750
	Morrison, William	B.A., Tor	Class (Interim)	1903	800
	Gray, Neil Roy	B.A., Tor	Eng., Hist., Fr., Ger (Interim)	1903	700
Brantford	Burt, Arthur William	B.A., Tor	Eng., His'., Fr., Ger	1893	1,800
	Passmore, Samuel F	M.A., Tor	Class	1885	1,200
	Hoag, James P	B.A., Queen's	Eng., Hist., Math	1893	1,200
	Coates, Daniel Harsum	B.A., Tor	Math	1893	1,200
	Bunnel, Effie Maria	Tor	Eng., Hist., Fr., Ger	1891	1,200
	Hamilton, James Reid	B.A., Tor	Sci	1893	1,200
	Shultis, Adam		Comme cial	1896	1,200
Brockville	Mowat, Alexander	B.A., Tor	Eng., Hist (Interim)	1901	1,500
	Copland, James Stewart	B.A., Tor.; M.A., McMaster	Sci		1,000
	Bryan, Hugh Wallace	M.A., Queen's	Class	1901	1,000
	Husband, Almeron Judson	B.A., Tor	Fr., Ger	1895	1,000
	Forbes, John W	B.A., Tor	Math	19.2	1,000
	Giles, A. Edith			190	750
	Richardson, Kate		Commercial	1898	750
Chatham	Paterson, David Smith	B.A., Tor	Eng., Hist., Fr., Ger	1876	1,500
	Twohey, William J	M.A., Tor	Class	1885	1,200
	Taylor, Wilson	B Tor	Math	1894	1,200
	Jewett, Albert E	B.A., Queen's	Sci	1896	1,200
	Lane, James S	B.A., Tor	Fr., Ger	1898	1,075
	Collins, Henry (Interim)		Comme cial	1902	950
	Sissons, Charles B	B.A., Tor	Class	1902	800
	Lafferty, Effie (Interim)	B.A., Tor		1903	500
Clinton	Houston, John	M.A., Tor	Eng., Hist., Fr., Ger	1892	1,225
	McLean, Ebenezer M		Sci	1894	950
	Stoddart, Robert	B.A., Tor	Class	1902	800
	Lougheed, Wm. James (Interim)	M.A., Tor	Math	1903	800
	Johnstone, Lily M (Interim)		Comme cial	1903	750
Cobourg	Mitchell, George Winter	M.A., Queen's	Class	1891	1,425
	Arthur, Colin Clayton	M.A., Queen's	Sci	1893	1,000
	Odell, John William	B.A., Tor	Math	1895	1,000
	Jones, Laura L	B.A., Tor	Eng., Hist, Fr., Ger	1898	700

	Anderson, Frank Cecil	B.A., Queen's	Sci	1904	1,000
	Minaker, Mary E.....(Interim)		Commercial	1904	400
Collingwood	Mills, George K	B.A., Tor	Sci	1901	1,400
	Hammill, George	B.A., Tor	Math	1892	1,050
	Colling, John Knowles	B.A., Tor	Class	1899	950
	Downey, Helen Elizabeth	B.A., Tor	Eng., Hist., Fr., Ger	1903	600
	Stone, Alice B.....(Interim)		Commercial	1902	675
Galt	Carscadden, Thomas	M.A., Tor	Eng., Hist	1885	1,750
	Logan, Charles James	B.A., Trin	Class	1883	1,200
	DeGuerre, Ambrose	B.A., Tor	Math	1890	1,200
	Evans, William Edwin		Commercial	1892	1,000
	Hamilton, Robert S	B.A., Tor	Sci	1894	1,100
	Carter, Janet Wishart	M.A., Tor	Eng., Hist. (Interim), Fr., Ger	1901	950
Goderich	Strang, Hugh Innis	B.A., Tor	Class	1871	1,300
	Field, John M	B.A., Tor	Eng., Hist., Fr., Ger	1900	1,000
	Merritt, Robert Norris	B.A., Tor	Math	1902	850
	Wilson, Herbert George	B.A., Tor	Sci (Interim)	1903	850
	Parlee, Edith		Commercial	1902	700
	Bailey, Joseph J.....(Interim)			1903	600
Guelph	Davison, James	B.A., Vic	Math	1878	1,500
	Hill, Ethelbert Lincoln	B.A., Tor	Sci	1889	1,100
	Skinner, Kate Clara	B.A., Tor	Eng., Hist., Fr., Ger	1895	900
	Glassey, David Alex	B.A., Tor	Class	1903	1,100
	Charlesworth, John William			1888	950
	Taylor, Luther William		Commercial	1902	1,000
Hamilton	Thompson, Robert Allan	B.A., Tor	Math	1886	2,000
	Turner, John Burgess	B.A., Queen's	Math., Science	1885	1,600
	Paterson, Andrew	M.A., Trin		1874	1,200
	Crawford, John Thomas	B.A., Tor	Math	1889	1,400
	Logan, William McGregor	B.A., Tor	Class	1892	1,400
	Hogarth, Eber Septimus	B.A., Tor	Eng., Hist., Fr., Ger	1892	1,400
	MacPherson, Fred. Fotheringham	B.A., Tor	Eng., Hist., Fr., Ger	1894	1,400
	Gill, James	B.A., B. Paed., Tor	Math	1892	1,200
	Morgan, Sydney Albert	B.A., D. Paed., Tor	Class	1891	1,200
	Asman, Henry Oldrid, Evison	B.A., Tor. & London, Eng		1892	1,100
	Overholt, Arthur Milton		Math	1901	1,000
	Johnston, George Lang	B.A., Queen's	Commercial	1888	900
	Bale, George Sidney....(Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1904	800
	McArthur, Edith Mary			1901	550
	Taylor, Mabel Annie	B.A., Queen's		1904	500
	Macphe son, Mary Constance	B.A., Queen's	(Domestic Science Instructor)	1902	375
	Parkhill, Thomas Edward		(Drill Instructor)	....	600
Ingersoll	Briden, William	B.A., Queen's	Class, Eng., Hist	1886	1,300
	McDonald, George Leslie	B.A., Tor	Eng., Hist., Fr., Ger	1895	1,000
	Cameron, John Shaw		Math	1898	900
	Norman, Lambert	B.A., Tor	Eng., Hist., Fr., Ger	1897	1,000
	Sexton, James Henry	M.A., Queen's	Sci	1902	900

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.—*Continued.*

Collegiate Institutes.	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
Kingston	Ellis, William Stewart	B.A., B.Sc., Vic	Math., Sci	1893	1,200
	Sliter, Ernest Oscar	M.A., Tor	Class	1888	1,800
	Dales, John Nelson	M.A., Tor	Eng., Hist., Fr., Ger	1889	1,200
	Lingwood, Frederick H	M.A., Trin	Class	1894	850
	Sills, William Ryerson	M.A., Queen's	Math	1897	1,150
	Ward, William	B.A., Queen's	Commercial	1898	950
	Duff, James	M.A., Queen's	Eng., Hist	1899	1,100
	Staples, Lorne Edgar (Interim)	M.A., Queen's	Sci	1902	800
	Beaton, Kate Florence	M.A., Queen's		1902	600
	Campbell, Alexander	B.A., Tor	Math	1903	700
	Hatch, A. F.	B.A., Bowdoin	(Manual Training Instructor)	1903	1,000
Lindsay	Harstone, John C	B.A., Tor	Math	1886	1,600
	Cornish, Geo. Augustine (Interim)	B.A., Tor	Sci	1903	1,000
	Hardy, Edwin A	B.A., Tor	Eng., Hist., Fr., Ger	1889	1,150
	Rosevear, Howard Stanley	B.A., Tor.; M.A., Harvard	Sci	1903	1,000
	Colling, James	B.A., Tor	Class	1894	1,150
	Staples, Lucy Lillian (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1903	800
London	Padcliffe, Samuel John	B.A., Tor	Eng., Hist., Fr., Ger	1891	2,000
	Little, Robert A	B.A., Tor	Class	1886	1,400
	Ferguson, William Chalmers	B.A., Tor	Eng., Hist., Fr., Ger	1892	1,300
	McCool, John	M.A., Tor	Eng., Hist., Fr., Ger	1897	1,200
	McCready, Samuel B	B.A., Tor	Sci	1898	1,200
	Govenlock, William M	B.A., Tor	Math	1898	1,175
	Wilson, Nicholas			1866	1,050
	Ardrus, Guy A			1888	1,100
	McVicar, Archmibald	B.A., Tor	Eng., Hist., Fr., Ger	1903	1,100
	Riddell, Frank P	B.A., Tor	Class	1898	1,075
	Jones, Samuel S			1893	1,000
	Horton, Charles W	B.A., Queen's	Eng., Hist	1895	1,050
	Dickenson, James Arthur		Commercial	1895	1,075
	McCutcheon, Fred. Wm. Caswell	B.A., Tor	Math., Eng., Hist	1900	1,075
	Downing, John Henry			1900	1,000
	Hanson, Fannie M			1897	800
	Kelso, Alice C			1887	800
	Stuart, Frederick Alfred	B.A., Tor	Sci	1903	1,000
	Mooney, Wm. H. Thomas (Interim)	B.A., Tor	Class	1903	900
Morrisburg	Jamieson, James Smyth	M.A., Vic	Eng., Hist	1882	1,200
	Massey, Arthur Wallace	B.A., Vic	Eng., Hist., Math	1892	900
	Saunders, William John	M.A., Queen's	Sci	1903	800
	Libby, Minnie Fennessy	B.A., Vic	Eng., Hist., Fr., Ger	1903	800
	Buchanan, John Alex (Interim)		Commercial	1902	800
	Cooke, John A	B.A., Queen's	Class	1904	900
Napanee	Flach, Ulysses J	M.A., Tor	Math	1900	1,400

	Reid, Marvin Ryckman	M.A., Queen's	Sci	1900	900
	Croskery, Robert Arthur	B.A., Queen's	Class	1903	900
	Burnham, Archibald Mowbray	B.A., Tor	Eng., Hist., Fr., Ger	1903	900
	Nichol, Margaret A			1892	600
	Smith, Margaret			1892	600
Niagara Falls	Dickson, James D	B.A., Tor	Math	1893	1,300
	Walker, David McKenzie		Commercial	1893	1,000
	Fleming, Ethel Katharine	B.A., Tor	Eng., Hist., Fr., Ger	1900	1,000
	Will, George Edwin	B.A., Tor	Class	1901	1,000
	Voaden, John (Interim)	B.A., Queen's	Sci	1903	900
	Dobbie, Mary I			1900	500
Orillia	Dickson, John Elder	B.A., Tor	Class, Eng., Hist	1899	1,500
	Doidge, Thomas Clarke	B.A., Tor	Math., Commercial	1899	1,000
	Johnston, Fred James	M.A., Tor	Sci		900
	Scovell, Holland R	B.A., Tor	Eng., Hist., Fr., Ger (Interim)	1900	700
	Elliott, Robert Leopold			1901	700
	Grant, Christine Cameron	B.A., Tor	Eng., Hist., Fr., Ger	1903	700
Ottawa	Macmillan, John	B.A., Tor	Eng., Hist	1881	2,500
	Jolliffe, Orion John	M.A., Vic	Class	1886	1,775
	McDougall, Alexander Hiram	B.A., Tor	Math	1889	1,775
	Marty, Aletta Elise	M.A., Queen's	Fr., Ger	1903	1,200
	Sykes, William John	B.A., Vic	Eng., Hist., Fr., Ger	1894	1,675
	Stothers, Robert	B.A., Queen's		1897	1,300
	Norris, Isaac Taylor	B.A., Queen's	Math	1898	1,150
	Campbell, Daniel Alexander	B.A., Tor	Sci	1896	1,500
	Graham, Wm. Andrew	B.A., Tor		1895	1,100
	Scott, Bessie Mabel			1892	900
	Macmillan, Herbert Seymour	B.A., Tor	Fr, Ger	1897	1,000
	Armstrong, Wm. Gilnochie	M.A., Tor	Eng., Hist., Fr., Ger	1901	900
	Simpson, Robert S		Commercial	1902	950
	Tomkins, Elizabeth A (Interim)			1902	750
	Liebner, Ernest Oscar	B.A., Queen's	Sci	1903	900
Owen Sound	Murray, Thomas	B.A., Tor	Math	1897	1,500
	Packham, James Henry	B.A., Vic	Math., Commercial	1884	1,150
	Whyte, David	B.A., Tor	Sci	1902	1,100
	McKellar, Herbert S	B.A., Tor	Fr., Ger	1898	1,100
	Howard, Edwy S	B.A., Vic	Eng., Hist	1902	1,100
	Brown, Lyman	M.A., Tor	Class	1903	1,000
	VanEvery, John F	B.A., Tor	Eng., Hist., Fr., Ger	1903	1,000
	Shields, Alfred J			1903	800
	Dowkes, William J (Interim)			1903	800
Perth	Hardie, William	B.A., Tor	Class	1899	1,200
	Edmiston, James Alfred			1893	850
	Preston, Thomas	B.A., Tor	Sci	1903	900
	McKim, William Andrew	B.A., Tor	Eng., Hist., Fr., Ger	1900	900
	Patterson, William John	M.A., Queen's and Clark	Math	1903	1,000
Peterborough	Fessenden, Cortez	M.A., Trin	Math	1890	2,000
	Fife, Jas. A	B.A., Tor	Math., Sci	1887	1,200
	Jeffries, John	B.A., Tor	Eng., Hist., Fr., Ger	1890	1,200
	Kenner, Henry R. H	B.A., Tor	Class	1893	1,200

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.—*Continued.*

Collegiate Institutes.	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
					$
Peterborough.—*Con.*	Srigley, Edgar Cooper		Commercial	1902	1,000
	Beattie, Wm. Robert.....(Interim)			1903	700
	Moore, John Leslie.....(Interim)		Eng., Hist., Fr., Ger	1903	700
Renfrew	McDowell, Charles	B.A., Queen's	Math	1879	1,150
	Ewing, William Campbell	M.A., Queen's	Sci	1896	800
	Berlanquet, Hugh S.....(Interim)	B.A., Queen's	Class	1904	800
	Lucas, Gavin Allan.....(Interim)	B.A., Tor	Commercial	1902	800
	Bennett, Alice Maud.....(Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	600
	McRae, Donella Maud....(Interim)	B.A., Queen's	Eng., Hist. Fr., Ger	1903	500
	Bowditch, Florence		(Domestic Science Instructor)	1902	650
Ridgetown	Little, John George	B.A., Tor	Math	1889	1,300
	Reid, Robert	B.A., Tor	Eng., Hist., Fr., Ger	1895	875
	Henderson, J. Van Wyck (Interim)	B.A., Tor	Class	1903	800
	Keillor, James	B.A., Queen's	Eng., Hist	1892	750
	McNeill, Wm. Kennedy..(Interim)			1903	800
St. Catharines	Henderson, John	M.A., Tor	Class, Eng., Hist	1872	1,600
	Robertson, William John	B.A., Tor., L.L.B., Vic	Math	1874	1,200
	Giffin, James A	B.A., L.L.B., Toronto	Sci	1892	1,100
	Cloney, Sara Louisa	M.A., Queen's	Eng., Hist., Fr., Ger	1896	1,000
	Laing, Arthur Stewart		Commercial	1898	900
	Stevenson, William John			1894	750
	Caverhill, Arthur E			1892	750
St. Mary's	Martin, Stephen	B.A., Tor	Math	1886	1,350
	Pearson, Alexander	B.A., Tor	Sci	1903	900
	Dobson, Percival Charles	B.A., Tor	Class	1904	900
	Clayton, Adelaide Helena R	B.A., Tor	Eng., Hist., Fr., Ger	1892	925
	Hatch, Salem B.....(Interim)			1903	700
St. Thomas	Quance, Noah	B.A., Tor	Class	1891	1,500
	Stevenson, Orlando John	M.A., D. Paed., Tor	Eng., Hist., Fr. Ger	1897	1,200
	Lees, Richard	M.A., Queen's	Sci	1894	1,200
	Voaden, Arthur		Commercial	1903	1,100
	McGee, Cyril Houghton	B.A., Trin	Math	1902	1,050
	Whiteley, Lester Robert	B.A., Tor	Eng., Hist., Fr., Ger	1901	700
	Jones, Louis E.....(Interim)	B.A., Tor		1902	650
	Webster, Charles Samuel	B.A., Tor		1902	650
	Cook, Margaret	M.A., Tor	Eng., Hist., Fr., Ger	1903	1,000
	Walker, Arthur J.....(Interim)			1903	600
Sarnia	Crassweller, Christopher L	B.A., Tor	Math	1902	1,400
	Grant, David M	B.A., Tor	Class	1885	1,300
	Corbett, Lewis C	B.A., Tor	Eng., Hist., Fr., Ger	1891	1,200
	Ivey, Thomas J	M.A., Tor	Sci	1902	1,000

	Fleming, Ethel May.....(Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	900
	Bridgman, Clara Mary			1902	750
	Cranston, David London..(Interim)	B.A., Tor	Math	1903	650
Seaforth	Rogers, Geo. F	B.A., Vic	Sci	1900	1,200
	Kirkwood, Florence Ethel	B.A., Tor	Class	1901	006
	Brown, Harry William	B.A., Tor	[illegible] Hist., Fr., Ger	1901	900
	Colling, George Featherston	B.A., Tor	Math	1901	900
	Miller, Nannie Mary Augusta		Eng., Hist	1903	750
Stratford	Mayberry, Charles Alexander	B.A., LL.B., Tor	Class	1891	1,600
	Robertson, Hugh S	B.A., Tor	Math	1900	1,150
	Lennox, Thomas H	B.A., Tor	Sci	1900	1,050
	Stevenson, Andrew	B.A., Tor	Eng. Hist	1901	1,050
	Malcolm, George	B.A., Queen's		1890	1,000
	Marty, Sophie E	M.A., Queen's	Eng., Hist., Fr., Ger	1899	1,050
	Robertson, George D	B. Queen's		1902	900
	Pentland, George E.....(Interim)			1903	750
	Adams, W. A		(Manual Training Instructor)	....	750
	Lewis, Esther		(Domestic Science Instructor)	....	....
Strathroy	Wetherell, James Elgin	B.A., Tor	Class, Eng., Hist	1883	1,500
	Auld, Charles	B.A., Tor	Math	1900	1,050
	Conn, Henry	B.A., Tor	Sci	1900	1,000
	Kent, Eleanor		Commercial	1899	750
	Bell, Jessie Margaret...(Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1903	750
Toronto (Harbord st.)..	Spotton, Henry Byron	M.A., Tor	Class, Sci	1891	2,800
	Hagarty, Edward William	B.A., Tor	Class	1891	1,800
	Balmer, Eliza May	B.A., Tor	Eng., Hist., Fr., Ger	1892	1,800
	Lawler, Gertrude	M.A., Tor	Eng., Hist., Fr., Ger., Math	1891	1,800
	Smyth, Thomas Henry	M.A., Tor	Sci	1892	1,400
	Cox, John Loane	B.A., Tor	Math	1891	1,800
	Eldon, Robert Henry	B.A., Queen's	Math., Commercial	1891	1,800
	Forfar, Charles	B.A., Tor	Eng., Hist., Fr., Ger	1891	1,800
	Kennedy, Lyman Aaron	M.A., Vic		1892	1,400
	Strath, Robert Smith	B.A., Tor	Math., (Interim)	1893	1,400
	Clark, Luther J	B.A., Queen's		1896	1,400
	Carstairs, John Stewart	B.A., Tor	Eng. Hist	1899	1,300
Toronto (Jameson Av)	Embree, Luther Edmund	M.A., Tor	Class, Eng., Hist., Fr., Ger	1888	2,900
	Smith, Gilbert Acheson	B.A., Tor	Sci	1889	1,900
	Hillock, Julia S	B.A., Tor	Fr., Ger	1900	1,150
	Birchard, Isaac J	M.A., Tor	Math	1893	1,500
	Crawford, Henry J	B.A., Tor	Class	1894	1,800
	Millar, James			1888	1,900
	Spence, Nellie	B.A., Tor	Class, Eng., Hist	1889	1,700
	Sinclair, John	B.A., Tor		1898	1,350
	Dandy, William P	B.A., Tor	Commercial	1903	1,000
Toronto (Jarvis St.)	Manley, Frederick Fitzpayne	M.A., Tor	Math	1875	2,800
	Chase, George A	M.A., Tor	Eng., Hist., Fr., Ger	1889	1,800
	Gray, Robert Alexander	B.A., Tor	Math	1900	1,550
	Shaw, George Edmund	B.A., Tor	Eng., Hist., Fr., Ger	1876	1,800
	Grant, Wilbur		Math	1881	1,800
	Michell, William C	B.A., Tor	Class	1897	1,550

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.—*Continued.*

Collegiate Institutes.	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
					$
	Gundy, Henry Wentworth	B.A., Tor	Class	1900	1,250
	Lehmann, Carl	B.A., Tor	Sci	1898	1,550
	Thomas, Janie	B.A., Tor	Eng., Hist	1882	1,350
	Smith, Herbert Hamilton	B.A., Tor	Sci	1903	1,000
	Wightman, Robert	B.A., Tor	Math	1903	1,000
	Dunn, Adelaide Teresa....(Interim)	B.A., Tor		1903	1,000
Toronto Junction	Colbeck, Franklin Charles	B.A., Vic	Class, Eng., Hist	1894	1,700
	Gourlay, Richard	B.A., Tor	Class, Math	1893	1,300
	Charles, Henrietta	B.A., Tor	Eng., Hist, Fr., Ger	1900	1,100
	Fletcher, William Hugh	M.A., Queen's	Sci., (Interim) Commercial	1902	1,050
	Barnes, Charles Lancelot (Interim)	B.A., Tor	Class	1901	750
	McLellan, Catharine		Commercial (Interim)	1903	700
Vankleek Hill	Jamieson, Thomas	B.A., Vic	Math	1899	1,100
	Haviland, Hugh Johnston	B.A., Tor	Class (Interim)	1904	750
	McLaurin, Peter C.....(Interim)	B.A., McMaster	Sci	1902	750
	Amess, Flora Ross.....(Interim)	B.A., Tor	Eng., Hist., Fr. Ger	1903	500
	Reesor, Lilian M.....(Interim)		Commercial	1903	550
Whitby	Hogarth, George Henry	B.A., Tor	Math	1899	1,150
	Denyes, J. Malcolm	B.A., Queen's	Fr., Ger., (Interim)	1903	800
	Walks, Robert Hilton	B.A., Tor	Eng., Hist., (Interim)	1900	800
	Forbes, William Brownie		Sci	3	800
	Deroche, Eleanor E	B.A., Tor	Class	1903	700
Windsor	Gavin, Frederick P	B.A., Queen's	Sci	1892	1,600
	Bell, Frederick Henry	B.A., Tor	Eng., Hist., Fr., Ger	1898	1,200
	Messmore, Joseph Franklin	B.A., Tor	Class	1899	1,100
	Neilson, James		Commercial	1898	1,100
	Cleary, Noah	B.A., Tor		1900	700
	Taylor, John Gladstone	B.A., Tor	Math	1903	1,100
	Marshall, John Wells	B.A., Queen's	Class	1903	1,000
Woodstock	Levan, Isaac Master	B.A., Tor	Class, Eng., Hist., Fr., Ger	1898	1,500
	Griffin, Albert Dyke	B.A., Queen's	Math	1882	1,200
	Kerr, Charles Staple	B.A., Tor	Eng., Hist. (Interim) Class	1889	1,100
	Cole, James McLarty		Sci	1898	1,100
	Watson, Ervin H. A.....(Interim)	B.A., Tor	Eng., Hist, Fr., Ger	1901	900
	Scratch, Linnie May		Commercial, Sci	1902	850
High Schools.	Miller, Eva Matilda.... (Interim)	B.A., Queen's	Eng., Hist., Fr., Ger	1903	650
Alexandria	MacKay, Donald	M.A., Tor	Class	1895	1,200
	Longmore, Howard Bruce	B.A., Queen's		1898	800
	Flath, Emma S	B.A., Queen's	Eng., Hist (Interim)	1903	600
Almonte	Treleaven, John Wesley	B.A., Tor	Class	1902	1,050

	McPhail, Alexander C.	B.A., Queen's		1899	750
	Thompson, Margaret Jane	B.A., Queen's	Fr., Ger. (Interim) Eng., Hist	1895	750
	McGuire, James F.....(Interim)	M.A., Queen's	Sci	1903	700
Arnprior	Morrow, Archibald Elston	B.A., Tor	Class	1898	1,100
	Hedley, James Walter....(Interim)	M.A., Tor	Math	1904	700
	Mitchell, Jessie Ann	B.A. Tor		1901	600
Arthur	Snider, Egerton F.	B.A., Vic	Math	1896	1,100
	Emslie, Wallace	B.A., Tor	Eng., Hist., Fr., Ger	1901	700
	Blyth, Janet M.....(Interim)			1904	425
Athens	Massey, Norman Levi	B.A., Vic	Math	1898	1,000
	Bishop, Charles Peter	B.A., Queen's	Commercial (Interim)	1895	800
	Dowsley, William Clinton	M.A., Queen's	Class, Eng., Hist	1899	800
	Graham, Robert Radie.....(Interi	B.A., Queen's		1904	600
Aurora	Mulloy, Charles Wesley	B.A., Tor	Class	1896	1,000
	Rice, John			1895	650
	McBride, Sara Mabel			1902	525
Beamsville	Myer, Albert Nicholas	M.A., Trin	Math	1898	900
	Ball, Kathleen Hester		Fr., Ger. (Interim)	1893	550
Belleville	Milburn, Edward Fairfax	B.A., Trin		1893	1,200
	Knight, William W.		Math	1892	900
	Clarke, Henry Jellyman		Sci	1892	900
	McRae, Jessie Carre			1889	625
	Luton, James T.	M.A., Tor	Class	1898	900
Berlin	Forsyth, David	B.A., Tor	Math	1901	1,500
	Sheppard, Frederick William		Eng., Hist	1888	1,100
	Weidenhammer, William B.	B.A., Tor	Eng., Hist., Fr., Ger	1901	1,000
	Jackman, David S	M.A., Tor	Sci	1902	1,000
	Dolan, George Robert	B.A., Queen's	Eng., Hist. (Interim) Class	1904	900
	Houstin, D. W.		(Manual Training Instructor)	1905	900
	Fisher, Katharine A.		(Housenold Science Instructor)	1903	500
Bowmanville	Gilfillan, James	B.A., Queen's	Sci	1880	1,200
	Frost, Francis Henry	B.A., Tor	Math	1896	900
	Wright, William Jonathan	M.A., Tor	Class	1903	900
	Allin, Elizabeth A.	M.A., Tor	Fr., Ger	1902	700
Bradford	Foucar, Walter K.	M.A., Tor	Fr., Ger. (Interim) Eng., Hist	1901	850
	Rumble, Isaac Albert....(Interim)	B.A., Tor	Math	1903	700
	Delmage, Emelyn E.....(Interim)	B.A., McMaster	Math	1903	450
Brampton	Fenton, William J.	B.A., Tor	Class	1894	1,300
	Galbraith, William John	B.A., Trin	Fr., Ger	1887	900
	Shields, Alexander M.	B.A., Tor	Eng. Hist	1902	850
	Cosens, Absalom	B.A., Tor	Sci	1897	900
	Rutherford, William H....(Interim)	B.A., Tor	Math	1903	700
Brighton	Newman, George Edmund	B.A., Queen's	Fr., Ger., (Interim) Eng., Hist	1896	1,000
	Burke, Alexander			1894	750

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.—*Continued.*

High Schools.	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
					$
Caledonia	Seaton, Edward T	B.A., Queen's	Math	1901	1,000
	Sealey, Ethel May (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1903	600
	Gundry, Helen Myrtle (Interim)	B.A., Tor	Class	1904	600
Campbellford	Hume, John Paterson	B.A., Queen's	Sci (Interim)	1896	1,000
	Boyes, Robert		Math	1895	800
	Kingston, Geo. A (Interim)	B.A., Tor		1901	750
	Simpson, James W	B.A., Tor	Eng., Hist., Fr., Ger (Interim)	1904	600
Carleton Place	Rand, Wilfrid E	B.A., Tor	Math	1902	1,000
	Asselstine, Robert Whiting	B.A., Queen's		1901	750
	McDonald, Neil			1890	750
	Macdonald, John Ford (Interim)	M.A., Queen's	Class	1901	800
Cayuga	Skeele, James Eton	B.A., Tor		1897	950
	French, Bruce	B.A., Tor		1899	650
	Lick, Addie	B.A., Tor	Math	1903	600
Colborne	Bellamy, Wesley	B.A., Vic		1890	925
	Keefe, Reuben Daniel (Interim)	B.A., Tor		1903	650
Cornwall	MacLean, Allan Edmund	B.A., Queen's	Fr., Ger	1898	1,200
	Nugent, James			1884	950
	Fitzgerald, Eliza Sophia	M.A., Queen's	Class	1899	1,000
	Birchard, Alexander Fraser			1898	800
	Crewson, Joseph W	B.A., Vic	Class (Interim)	1902	900
Deseronto	Smellie, William K. T	B.A., Tor	Sci	1896	1,150
	Whyte, Robert	B.A., Tor		1896	850
	French, Wycliffe A (Interim)	B.A., Tor		1903	700
Dundas	Meiklejohn, Allan J	B.A., Queen's	Eng. Hist	1901	1,150
	Saunders, William Robert	B.A., Queen's		1903	800
	Panton, Agnes Wilkie			1892	575
Dunnville	Witton, James Gayford	B.A., Tor	Math	1903	1,000
	Graham, Peter Edwin	B.A., Queen's	Eng., Hist. (Interim), Fr., Ger	1903	800
	Smeaton, William (Interim)	B.A., Tor	Sci	1903	850
Dutton	Taylor, John, Andrew	B.A., Queen's	Sci	1898	950
	Simpson, Ernstein (Interim)	B.A., Tor	Math	1902	650
	Ferguson, Geo. A (Interim)	B.A., Tor		1902	625
	Story, Selina Gladys (Interim)	M.A., Queen's	Eng., Hist., Fr., Ger	1903	450
East Toronto	French, Fred. William	B.A., Tor	Class	1903	1,100
	Graham, Louis Hartley (Interim)	M.A., Tor	Sci	1903	800

Elora	MacMurchy, Norman	B.A., Tor	Sci	1895	1,000
	Armstrong, Frank (Interim)	B.A., Tor	Math	1902	650
	Francis, Annie Buchan (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	525
Essex	Anglin, Robert W	M.A., Queen's	Math	1902	1,100
	Teskey, Edith A	M.A., Tor	Class	1901	800
	Keith, Arthur W (Interim)	B.A., Tor	Sci	1902	775
	Baird, Mabel M. J (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1903	550
Fergus	Freeman, John A	B.A., Tor	Class	1903	1,000
	Campbell, Archibald L			1894	800
	Cdlum, Eleanor Dora (Interim)	B.A., Trin	Eng., Hist., Fr., Ger	1903	475
Forest	McKinley, James Matthew	B.A., Tor	Class	1901	900
	Martyn, Harold George (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	650
	Girdwood, Arthur R (Interim)	B.A., McMaster	Math	1903	650
Fort William	Pilkey, Peter Joseph	B.A., Queen's		1901	1,150
	Wood, Elmore Everton	B.A., McMaster	Math	1902	900
Gananoque	Graham, Robert George	B.A., Vic	Math	1894	1,200
	Irwin, Herbert W (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	750
	Galbraith, Thomas M. (Interim)			1903	700
Georgetown	Coats, Richard David	B.A., Tor	Class	1897	1,000
	Williams, Lorne Joseph			1903	700
	Watterworth, Grace McC		Commercial	1900	600
Glencoe	Morrow, John Duncanson	B.A., Tor	Class	1898	850
	Hobbs, Thomas (Interim)	B.A., Tor	Math	1902	700
	Macalister, Ursilla (Interim)	M.A., Queen's	Eng., Hist., Fr., Ger	1902	550
Gravenhurst	Thomson, Peter M	M.A., Queen's	Sci	1903	900
	Alexander, Helen Bow (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1903	500
Grimsby	Harrison, Charles W	M.A., Vic		1894	800
	Strang, Rose Innis			1901	500
Hagersville	Jones, George Mallory	B.A., Tor	Eng., Hist., Fr., Ger	1900	950
	Kaiser, Jesse B			1891	780
	Wright, Robert			1896	650
Harriston	MacLean, Godwin V	M.A., Tor. and Harvard	Math	1901	1,000
	Corkill, Edward J	B.A., Queen's	Sci	1902	700
	McKinnon, Charles (Interim)	B.A., Tor		1903	700
	Trenaman, Mabel Natalie	B.A., Tor	Eng., Hist., Fr., Ger	1904	550
Hawkesbury	Clothier, James O	B.A., Queen's	Fr., Ger., (Interim)	1902	1,000
	Sine, Frederick L (Interim)			1902	600
	Higginson, Maria Adelaide			1897	550
Iroquois	Stanley, Thomas E. A	B.A., Tor	Math	1897	1,000
	Anderson, William George	B.A., Tor	Class	1901	775
	Smith, Arthur	B.A., Tor	Sci	1903	700
	Rose, Marion H		Fr., Ger	1898	625

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.—*Continued.*

High Schools.	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
					$
Kemptville	Dillane, William	B.A., Tor		1895	1,100
	Nelson, John	B.A., Queen's	Math	1896	800
	Moore, James R	M.A., Queen's	Sci	1901	900
	Morris, Arthur W (Temporary)	B.A., Tor		1903	600
	Evarts, Howard A (Interim)			1904	500
Kincardine	Perry, Samuel Walter	B.A., Vic	Class	1890	1,200
	Courtice, Samuel James	B.A., Tor	Math., (Interim)	1903	800
	Grainger, Horace Alex (Interim)	B.A., Tor	Sci	1902	800
	Henry, Edith M (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1904	700
Leamington	Elliott, John	B.A., Queen's	Eng., Hist., Math	1896	1,100
	Bonis, Harry	B.A., Tor	Class	1899	775
	Robertson, Alexander Morton	M.A., Queen's	Math., Fr., Ger	1900	775
	Knox, Robert Hunter	B.A., Tor	Sci	1902	750
Listowel	Phillips, William Alexander	B.A., Tor	Eng., Hist., Fr., Ger	1892	1,100
	Nicholl, William Wallace	B.A., Tor	Math	1898	900
	Clark, Joseph Campbell	B.A., Tor	Class	1902	900
Lucan	Wren, John Stewart	B.A., Tor	Math	1903	900
	Brunt, Robert Anthony	B.A., Tor	Sci., (Interim)	1904	650
	Cunningham, E. G (Interim)	B.A., Tor		1904	500
	Mara, Ida M (Interim)			1903	450
Madoc	Watson, Alexander H	B.A., Tor		1889	1,100
	Rogers, William Henry (Interim)	M.A., Trin		1902	650
	Ward, Clara Anne (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	500
Markham	Reed, George Henry	M.A., B. Paed., Tor	Class	1890	1,100
	Davidson, John H (Interim)	M.A., B. Paed., Tor	Math	1902	725
	Annis, Mary A	B.A., Tor	Fr., Ger., (Interim)	1895	600
	McKay, Donald Alexander	B.A., Queen's	Sci	1901	700
	Mairs, Edith M	B.A., Trin		1902	450
Meaford	Cornwell, John Leslie	B.A., Tor	Math	1900	1,200
	Hall, Samuel	B.A., Queen's	Sci	1891	800
	Dundas, Arthur A	B.A., Tor		1897	800
	Dingle, Grace Keam	B.A., Tor	Eng., Hist., Fr., Ger	1900	675
Mitchell	Ellis, William	B.A., Tor	Math	1882	1,050
	Carter, Eslie (Interim)	B.A., Tor		1903	800
	Stephens, Robert H (Interim)			1902	700
Mount Forest	Brethour, John Henry	B.A., Vic	Class	1891	1,150
	Keith, George Walter	B.A., Tor	Math	1900	850

	Fraser, James William (Interim)	B.A., Tor		1903	650
	McKinley, Ada Rachel (Interim)	B.A., Tor		1903	450
Newburgh	Neslit, David Ashton	B.A., Queen's	Eng., Hist., (Interim)	1893	1,000
	Millar, Frederick Gourlay	B.A., Tor		1903	650
	Mott, Sandford Hamley			1903	650
Newcastle	Davidson, Hugh	B.A., Tor		1888	850
	Grose, Caroline			1901	400
Newmarket	Coombs, Albert Ernest	M.A., B. Paed., Tor	Class	1899	1,050
	Hollingshead, John Edwin			1884	750
	Carefoot, George Andrew		Sci	1903	700
Niagara	Barron, Robert Armour	B.A., Tor	Class, Eng., Hist., Fr., Ger	1900	800
	Anderson, Lillie C. (Interim)			1904	450
Niagara Falls South	Gibbard, Alexander H.	B.A., Tor	Eng., Hist., Fr., Ger	1901	1,000
	Brown, Duncan A			1902	600
	Morrison, Amy May	B.A., Tor		1901	500
North Bay	McDougall, James R. (Interim)	B.A., Queen's	Class	1902	1,100
	Breuls, Ira D	B.A., Queen's	Sci	1903	900
	Barr, Miss J	B.A., Queen's		1903	600
Norwood	Davidson, John	M.A., L.L.B., Vic	Class	1882	1,100
	Closs, Frank David		Sci	1901	600
	Archer, May Alice			1904	600
Oakville	Wellwood, Nesbitt John	B.A., Tor	Math	1877	1,050
	Hodgson, Jos. Emerson (Interim)	B.A., Tor		1902	750
	Doherty, Mabel (Interim)		Commercial	1903	600
Omemee	Jardine, William Wilson	B.A., Tor		1898	800
	Harvey, William Blakely			1903	700
Orangeville	Steele, Alexander	B.A., Tor	Eng., Hist., Math	1879	1,400
	Clarke, Frederick Hall	B.A., Tor	Eng., Hist., Fr., Ger	1895	900
	Dunkley, Albert Wesley	M.A., Queen's	Class	1901	800
	McDonald, Wilbert L			1901	500
	McNeelly, Priscilla V. M	M.A., Trin	Sci. (Interim)	1903	700
Oshawa	Smith, Lyman C	B.A., Vic	Class, Eng., Hist	1882	1,300
	Slemon, Edward T	B.A., Vic	Math	1892	1,000
	Panton, Jessie R			1886	650
	Stevenson, Louis	B.A., B.Sc., Vic	Math., Sci	1902	1,000
	Mills, Martha Christine	B.A., Queen's	Fr., Ger	1901	600
Paris	Bell, Walter N	B.A., Tor	Class	1898	1,300
	Hedley, Robert Wesley	B.A., Tor	Math	1902	750
	Madill, Alonzo James (Interim)	B.A., McMaster	Sci	1902	650
Parkhill	McDougall, Neil	B.A., Tor	Sci	1896	900
	Taylor, Emma Jean (Interim)	B.A., Tor		1903	550
	Guest, Emily Jane		Eng., Hist., (Interim)	1901	600
	Stockdale, Thomas N. (Interim)			1904	700

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.—*Continued.*

High Schools	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
					$
Pembroke	Ross, Ralph	B.A., Tor	Class	1895	1,200
	White, Edwin Theodore	B.A., B. Paed., Tor	Math	1901	900
	Glanfield, Wm. John (Interim)	M.A., Tor	Sci	1903	800
	Shirreff, Robert Marshall		Fr., Ger., (Interim)	1895	800
Petrolea	Bell, John Johnstone	B.A., Tor		1886	1,200
	Clyde, William	M.A., Queen's		1886	1,050
	Donaldson, William	B.A., Tor		1902	800
	Hills, Minnie (Interim)	B.A., Tor	Math	1903	650
Picton	Dobson, Robert	B.A., Vic	Math	1880	1,200
	Reynar, Marianne Beatrice	B.A., Tor	Eng., Hist., Fr., Ger	1901	700
	Dolan, John Henry	B.A., Queen's	Class	1899	1,100
	Kemp, William	M.A., Queen's	Eng., Hist., Fr., Ger	1903	800
	Hamilton, William John		Sci. (Interim)	1903	900
Port Arthur	McCulloch, Andrew	M.A., Queen's		1894	1,266
	Morgan, James W.		Eng., Hist.	1890	1,066
	Aitchison, Belle			1903	600
Port Dover	Liddy, William R	B.A., Tor	Sci	1897	800
	Martin, John Strickler	B.A., Tor		1899	600
Port Elgin	Lillie, John Turner	B.A., Vic	Class	1889	1,100
	Innis, Alexander R			1892	750
	MacDonald, Jessie E. O.	B.A., Tor		1903	550
Port Hope	Kirkconnell, Thomas A	B.A., Queen's	Math	1888	1,300
	Caesar, Lawson	B.A., Tor	Class	1900	950
	Weir, Annie	B.A., Tor	Eng., Hist., Fr., Ger	1897	800
	Moir, Catharine Elizabeth			1896	600
	Stewart, Robert			1903	900
Port Perry	McBride, Dugald	B.A., Vic	Class, Math	1871	1,300
	Stone, George			1883	850
	Houston, Jessie (Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1903	500
Port Rowan	Pugsley, Edmund	B.A., Vic	Sci	1896	900
	Shawcross, Mary Louise (Interim)			1903	450
Prescott	Rose, Robert Charles	B.A., Tor	Math	1896	1,080
	McPherson, Hattie Georgina	B.A., Queen's	Eng., Hist., Fr., Ger	1900	550
	Shaw, Marlow W. (Temporary)	B.A., Tor		1904	750
Rat Portage	Roberts, Thomas Henry	B.A., Tor		1902	1,200
	Wilson, W. Asbury	B.A., Queen's		1903	1,000

Richmond Hill	Shaw, Robert	B.A., Tor. and McMaster	Math. (Interim)	1902	800
	Jennings, E. W.....(Interim)	B.A., Tor		1903	600
	Bell, Miss M. F. W.....(Interim)			1903	400
Sault Ste. Marie	Race, Wilfrid Ballentine	B.A., Queen's		1904	1,100
	Dent, William Arthur		Sci	1903	900
	Rudlen, George William	B.A., Tor	Math	1904	900
Simcoe	Christie, James Douglas	B.A., Tor	Eng., Hist., Fr., Ger	1889	1,300
	Galbraith, Robert	B.A., Queen's	Ma	1899	900
	Thompson, John Fletcher	B.A., Tor	Class	1899	850
	Morgan, John James	B.A., Vic	Sci	1903	850
Smith's Falls	Houston, John Arthur	M.A., Trin	Math	1887	1,200
	Stubbs, Samuel John	B.A., Tor. and Queen's	Eng., Hist., Class	1897	950
	Smith, Thomas Corlett			1903	600
	Pitcher, Winona Jessie	B.A., McGill		1901	550
Smithville	Tremeer, James	B.A., Vic	Class	1898	950
	Hill, Mary Alpena.....(Interim)			1902	400
	De La Matter, Cornelia..(Interim)	B.A., Queen's		1903	400
Stirling	Kennedy, Geo. E	B.A., Vic	Sci	1893	900
	Dickey, Martha Ada.....(Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	475
	Hutchinson, Mary R .....(Interim)			1902	425
Streetsville	Cameron, Aldis W	B.A., Tor	Eng., Hist	1898	800
	McHugh, Marshall W	B.A., Tor	Math	1903	650
Sydenham	Henry, Thomas McKee	B.A., Tor	Math	1903	1,000
	Brown, Percy William		Sci	1903	750
	Henstridge, Elizabeth... (Interim)	M.A., Queen's	Eng., Hist. Fr., Ger	1901	500
Thorold	Bald, William Francis	B.A., L.L.B., Tor	Class	1898	1,200
	Smith, Margaret T. Hubner			1898	700
Tillsonburg	Ross, Alexander H. D	M.A., Queen's	Sci., Math	1898	1,000
	Mabee, George A	B.A., Tor	Fr., Ger	1903	700
	Malcolm, Wyatt			1901	600
Trenton	Ingall, Elmer Ellsworth	B.A., Tor. and Queen's		1895	1,050
	Longman, Edwin		Math	1892	775
	Pattee, Mrs. Ada		Eng., Hist	1889	750
	Iraland, Franklin N .... (Interim)	B.A., Man		1903	600
Uxbridge	Park, Henry George	B.A., D. Paed., Tor	Class	1888	1,000
	Barr, Lydia A			1891	500
	Lang, Hector .....(Interim)	B.A., Tor	Math	1903	650
	Tapscott, Cora I.....(Interim)	B.A., Tor		1903	500
Vienna	Bigg, Edmund Murray	M.A., Tor	Sci	1901	750
	Clayton, Vivian E.....(Interim)		Commercial	1903	450
Walkerton	Morgan, Joseph	M.A., Tor	Class	1881	1,200
	Norris, James	M.A., Queen's	Math	1903	1,000
	Day, Alfred Ernest	M.A., Queen's	Eng., Hist., Fr., Ger	1901	800

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1904.—*Continued.*

High Schools.	Names of teachers.	Degrees.	Specialists.	Date of Appointment.	Salary.
					$
Walkerton.—*Con.*	Cheswright, Richard C.	.....	Sci	1900	800
Wardsville	Elliott, Thomas E.	B.A., Tor	Eng., Hist., Fr., Ger	1901	800
	Goulding, Hannah M....(Interim)	.....	.....	1902	400
Waterdown	Perry, Peter	M.A., Trin	Class	1902	850
	Gunn, Daniel Wesley	B.A., McMaster	Math	1901	650
	McQueen, Rose J.....(Interim)	.....	.....	1903	400
Waterford	Vills, John Hudson		Class	1899	1,100
	McKechnie, John Henry (Interim)	M.A., Queen's	Math	1904	700
	Conlin, Evelyn E.....(Interim)	B.A., Tor	Eng., Hist., Fr., Ger	1902	550
Watford	Potter, Charles	B.A., Tor	Math	1892	1,050
	McQueen, James M.	B.A., Tor	Eng., Hist., Fr., Ger.....(Interim)	1903	700
	Ramsay, James Alex.....(Interim)	.....	.....	1902	600
	Bambridge, Celia	.....	.....	1900	500
Welland	McQuaig, Herbert M.	B.A., Queen's	.....	1891	1,100
	McNiece, James	B.A., Tor	Sci	1895	900
	Foster, Jessie	.....	Fr., Ger	1899	550
	Buchner, Claribel M.	.....	.....	1901	500
Weston	Kennedy Thomas	M.A., Queen's	Math	1902	850
	Hubbard, Joseph J.....(Interim)	.....	.....	1904	500
	Tennant, Isabella Leathem	B.A., Tor	Eng., Hist., Fr., Ger.....(Interim)	1901	500
Wiarton	Baines, Archibald W.	B.A., Trin	.....	1895	1,000
	Jermyn, Percy Thomas	B.A., Tor	.....	1900	700
	McMillan, George .....(Interim)	.....	.....	1903	525
Williamstown	MacDonald, James	M.A., Queen's	Class	1898	1,100
	Witherill, Ebenezer Rufus	B.A., Queen's	.....	1895	800
	Shepherd, Martin Ward..(Interim)	B.A., Tor	.....	1903	650

SUMMARY, January, 1904.

Number of Schools, Sex of Teachers, and Percentages.

Collegiate Institutes	41
High Schools	94
Total	135
Increase for the year	1

Teachers.

Gentlemen	488
Ladies	131
Total	619
Increase for the year	26

Percentages.

January 1904,	Gentlemen,	78.8	Ladies,	21.2
January 1903,	Gentlemen,	81.4	Ladies,	18.6

Number of Teachers.

Collegiate Institutes.

Principals	41
Assistants	267
Total	308
Increase for the year	23

High Schools.

Principals	94
Assistants	217
Total	311
Increase for the year	3

Grand Total.

Principals	135
Assistants	484
Grand total	619
Increase for the year	26

Salaries.

Collegiate Institutes.

Highest salary	$2,900
Average salary, Principals	1,604
Average salary, Assistants	1,018
Average salary	$1,097
Increase for the year	1

High Schools.

Highest salary	$1,500
Average salary, Principals	1,053
Average salary, Assistants	699
Average salary	806
Increase for the year	21

Collegiate Institutes and High Schools.

Highest salary	$2,900
Average salary, Principals	1,220
Average salary, Assistants	875
Average salary	950
Increase for the year	16

Universities, etc., of Teachers.

Collegiate Institutes and High Schools

Toronto	319
Victoria	34
Queen's	109
Trinity	15
McGill	1
McMaster	9
Manitoba	1
British	1
Interim Certificates	118
Specialists	364
Interim Specialists	96
D. Pæd	3
B. Pæd	5
Graduates	484
Non-Graduates	135

Percentage of graduates	78.19
Percentage of non-graduates	21.91
Percentage of Specialists and Interim Specialists	74.31
Percentage of non-specialists	25.69

APPENDIX Q.—MISCELLANEOUS COMPARATIVE STATISTICS.

I.—Statistics of Elementary Education in Various Countries.

Comparative statement of the percentage of enrolled pupils to the total population, in the elementary schools of various countries, and the cost per capita of enrollment.

Countries.	Percentage of total population enrolled.	Expenditure per capita of enrollment.
Europe.		$ c.
Austria-Hungary	14 0	4 90
Belgium	11.86	9 85
Denmark	12.5	
France	14.1	a11 32
German Empire	16.5	10 62
Great Britain and Ireland :		
England and Wales	18.08	11 05
Scotland	17.16	11 80
Ireland	16.91	8 05
Greece	6.8	.....
Italy	7.7	5 30
Netherlands	14.3	8 85
Norway	15.0	7 20
Portugal	4.4	.....
Roumania	5.7	.....
Russia	3.3	.....
Finland	11.3	2 14
Servia	4.0	.....
Spain	7.3	.....
Sweden	13.7	10 17
Switzerland	20.0	9 54
Asia.		
Japan	10.7	2 46
Africa.		
Cape of Good Hope	9.69	8 76
Egypt	2.2	.....
Natal	4.5	11 67
North America.		
Dominion of Canada :		
British Columbia	13.37	24 62
Manitoba	21.18	26 91
New Brunswick	18.26	9 85
North West Territories	12.47	.....
Nova Scotia	21.55	9 22
ONTARIO	20.94	10 63
Quebec	12.30	9 88
Prince Edward Island	20.14	7 99

(a) Public Schools only.

APPENDIX Q.—MISCELLANEOUS COMPARATIVE STATISTICS.—(*Continued.*)

1.—Statistics of Elementary Education in Various Countries.—(*Concluded.*)

Countries.	Percentage of total population enrolled.	Expenditure per capita of enrollment
		$ c.
North America.—Concluded.		
Newfoundland	16.08	5 51
Mexico	5.1	4 34
United States	20.98	14 77
Bermuda	12.64	3 89
West Indies.		
Jamaica	11.	*b*2 51
Central America.		
Costa Rica	5.7	15 78
Guatemala	2.9	6 72
Honduras	4.8	2 00
Nicaragua	3.6	.....
Salvador	2.9	.....
South America.		
Argentine	9.4	28 07
Bolivia	1.8	3 28
Brazil	2.1	.....
Chili	3.9	.....
Colombia	3.6	5 91
Ecuador	6.4	.....
Paraguay	4.7	.....
Peru	2.0	2 56
Uruguay	5.8	13 58
Venezuela	4.3	4 83
Australasia.		
New South Wales	17.59	16 36
Queensland	19.51	14 52
South Australia	17.70	11 85
Victoria	20.29	14 39
West Australia	11.15	15 55
New Zealand	16.99	20 97
Tasmania	11.15	12 66

b By Government.

APPENDIX Q.—MISCELLANEOUS COMPARATIVE STATISTICS.—(*Continued.*)

II.—(1) Teachers and Average Salaries in the Public Schools of the United States and the Province of Ontario.

	Whole number of different teachers employed.			Average yearly salary of teachers.	
	Male.	Female.	Total.	Males.	Females.
				$ c.	$ c.
United States	122,392	317,204	439,596	*a* 490 50	*a* 397 70
State:					
Connecticut	389	3,929	4,318	992 90	445 10
Illinois	6,800	20,386	27,186	645 50	541 80
Indiana	7,006	9,033	16,039	668 00	480 00
Iowa	4,161	24,912	29,073	436 60	301 70
Kansas	3,386	8,323	11,709	442 40	365 50
Maine	943	5,691	6,634	360 50	272 40
Massachusetts	1,214	12,408	13,622	1,409 40	527 50
Michigan	3,040	13,014	16,054	486 80	366 80
Minnesota	1,974	10,631	12,605	535 00	372 10
Missouri	5,562	10,785	16,347	426 70	428 90
Nebraska	1,862	7,767	9,629	491 50	385 10
New Hampshire	207	2,169	2,376	*b* 435 80	*b* 291 10
New Jersey	1,041	6,897	7,938	871 50	520 60
New York	5,060	31,576	36,636	.....	.....
North Dakota	1,198	3,385	4,583	427 00	371 40
Ohio	9,913	16,497	26,410	420 00	370 00
Pennsylvania	8,585	22,055	30,640	449 20	337 80
Rhode Island	172	1,830	2,002	1,160 10	519 90
South Dakota	1,007	4,045	5,052	400 30	335 20
Vermont	458	3,448	3,906	405 40	291 30
Wisconsin	2,243	10,913	13,156	533 30	395 20
Ontario	*c* 2,777	*c* 7,183	*c* 9,960	*c* 532 60	*c* 318 60

a Average for those States reporting salaries.

b High School teachers' salaries not included.

c Includes Public and High Schools, so as to correspond with the Public Schools of the United States.

2. Salaries of Grade Teachers.

Maximum salaries paid women grade teachers in certain cities of the United States.

New York, $1,440; Chicago, $1,000; San Francisco, $996; Washington, $950; Boston, $936; Cleveland, $850; Milwaukee, $840; Cincinnati, $800; Cambridge, $750; Minneapolis, $750; St. Louis, $735; Detroit, $725; Pittsburg, $700; Philadelphia, $670.

APPENDIX Q.—MISCELLANEOUS COMPARATIVE STATISTICS.—(*Continued.*)

III.—Statistics of Public High Schools in the United States; and High Schools in the Province of Ontario.

	No. of Schools.	No. of teachers.	No. of students.	Per cent. of students studying languages.			
				Latin.	Greek.	French.	German.
United States	6,292	22,415	550,611	50.07	2.50	8.61	16.25
STATE.							
Connecticut	75	393	8,679	47.21	6.60	16.82	23.01
Illinois	355	1,581	41,677	48.51	.98	5.60	17.98
Indiana	382	1,167	27,281	64.69	.24	.69	15.84
Iowa	346	1,160	29,018	48.57	.24	.47	12.74
Kansas	220	577	15,883	57.19	.92	.30	12.27
Maine	145	354	8,868	43.94	8.25	24.50	2.15
Massachusetts	244	1,690	39,251	43.73	7.56	40.80	12.86
Michigan	297	1,167	29,158	35.37	.87	4.21	20.42
Minnesota	128	626	14,822	60.11	.69	6.54	23.88
Missouri	263	809	21,186	52.60	2.13	2.66	14.58
Nebraska	303	648	16,143	60.16	.53	.59	10.75
New Hampshire	58	195	3,795	54.20	7.25	35.78	4.95
New Jersey	93	576	12,075	46.72	2.59	7.55	36.17
New York	393	2,441	66,735	44.59	4.45	13.81	24.13
North Dakota	33	82	1,503	67.40	.....	.67	13.77
Ohio	720	1,846	46,906	52.30	1.31	3.00	14.23
Pennsylvania	388	1,314	34,247	56.14	3.02	4.14	10.12
Rhode Island	22	171	3,684	44.06	10.26	26.17	16.96
South Dakota	71	143	3,090	42.17	.03	.19	8.48
Vermont	58	159	3,697	45.28	5.92	19.99	7.76
Wisconsin	215	813	19,723	23.00	.64	.23	23.32
Ontario	134	593	24,172	17.16	2.58	55.55	13.10

APPENDIX Q.—MISCELLANEOUS COMPARATIVE STATISTICS.—(*Continued.*)

IV.—Statistics of Public Normal Schools in the United States; and Normal Schools in the Province of Ontario.

—	No. of schools.	Teachers for normal students.	Students in normal departments.[a]	Graduates.	No. reporting as to income.	Income.
						$
United States	173	2,487	49,403	8,584	146	3,985,804
STATE.						
Connecticut	4	89	634	178	1	16,000
Illinois	5	91	2,700	421	4	209,168
Indiana	2	44	2,259	120	1	72,128
Iowa	3	61	2,232	152	3	103,665
Kansas	1	42	1,833	143	1	65,134
Maine	5	39	641	164	4	24,374
Massachusetts	11	141	1,800	506	8	244,916
Michigan	4	88	2,165	338	3	155,819
Minnesota	5	82	1,120	323	4	137,352
Missouri	3	48	2,045	118	3	81,425
Nebraska	1	20	630	106	1	30,000
New Hampshire	1	10	140	....	1	20,900
New Jersey	4	66	907	306	1	48,000
New York	17	325	6,119	1,693	13	526,870
North Dakota	2	18	376	19	1	14,923
Ohio	3	22	468	183	1	24,590
Pennsylvania	15	273	6,487	1,699	15	448,886
Rhode Island	1	25	209	.....	1	58,500
South Dakota	3	33	539	65	3	55,310
Vermont	3	18	305	119	3	17,150
Wisconsin	8	132	2,540	510	7	258,301
Ontario	*b*4	*b*31	*b*751	*b*745	3	61,678

a In the Normal Schools of the United States both academic and professional work is generally taken up. In Ontario the work is entirely professional.

b Including Normal College.

APPENDIX Q.—MISCELLANEOUS COMPARATIVE STATISTICS.—(*Continued.*)

V.—Salaries of Superintendents of City Schools, and Principals of Normal, High, Elementary and Kindergarten Schools in Certain Cities of the United States and Ontario.

City.	Salary of Superintendent of City Schools.	Principal of Normal or Training School.	Principal of High School (highest salary paid.)	Principal of the largest Elementary School.	Kindergarten Director (highest salary.)
	$	$	$	$	$
New York, N. Y.	8,000	5,000	5,000	3,500	1,240
Chicago, Ill.	10,000	5,000	3,000	2,500	.....
Philadelphia, Pa.	5,000	4,000	4,000	1,865	620
St. Louis, Mo.	5,500	*a*	*a*3,605	2,060	735
Boston, Mass.	6,000	3,780	3,780	3,180	792
Baltimore, Md.	4,000	2,400	2,400	2,000	504
Cleveland, Ohio.	5,000	3,000	3,500	1,700	750
Buffalo, N. Y.	5,000	1,800	2,500	2,000	600
San Francisco, Cal.	4,000	.....	3,000	2,400	.....
Cincinnati, Ohio.	4,500	.....	1,600	*b*2,100	.....
Detriot, Mich.	4,000	*c*	3,090	1,800	725
Milwaukee, Wis.	4,000	.....	2,500	1,700	600
Washington, D. C.	4,000	1,600	1,600	1,500	500
Newark, N. J.	4,500	3,000	3,500	2,900	650
Minneapolis, Minn.	4,000	.....	2,500	1,450	.....
Providence, R. I.	4,000	.....	2,500	2,000	600
Indianapolis, Ind.	*c*	*c*	.....	1,200	.....
Kansas City, Mo.	4,000	.....	2,565	1,620	450
St. Paul, Minn.	3,600	*c*	3,000	1,500	750
Rochester, N. Y.	5,000	2,000	2,500	1,650	550
Denver (District No. 1), Colo.	5,000	.....	3,200	2,000	550
Alleghany, Pa.	3,000	.....	2,000	2,000	.....
Columbus, Ohio.	3,000	1,350	1,800	1,980	.....
Worcester, Mass.	4,000	.....	3,000	1,900	600
Syracuse, N. Y.	3,600	.....	3,000	1,600	.....
New Haven, Conn.	*c*	.....	3,000	1,000	600
Paterson, N. J.	3,000	1,750	2,000	1,800	575
Omaha, Neb.	3,600	.....	2,400	1,500	700
Los Angelas, Cal.	3,300	.....	2,500	1,500	600
Lowell, Mass.	3,000	2,000	3,000	2,000	500
Albany, N. Y.	3,000	1,900	3,000	1,900	600
Cambridge, Mass.	3,500	2,500	3,000	2,000	700
Portland, Oreg.	2,500	.....	1,700	1,500	.....
Atlanta, Ga.	2,400	.....	2,000	1,200	.....
Grand Rapids, Mich.	3,350	*c*	2,400	1,500	575
Dayton, Ohio.	3,000	1,350	1,890	1,350	612
Camden, N. J.	2,500	.....	1,200	1,000	500
Lawrence, Mass.	3,000	1,100	2,500	2,000	.....
New Bedford, Mass.	3,500	1,500	2,750	1,900	550
Somerville, Mass.	3,000	....	3,000	1,900	600
Hamilton, Province of Ontario	*d*	3,000	2,000	1,200	550
Toronto, " "	*d*	2,500	2,900	1,600	1,000
Ottawa, " "	*d*	2,350	2,500	1,500	500
London, " "	*d*	2,500	2,000	1,400	600

a The Normal School is connected with the High School.

b "Intermediate Schools" comprising the 6th, 7th and 8th years of the course.

c Not given.

p In Ontario there is no provision for having both High and Public School sunder one Superintenent as is the rule in the United States.

APPENDIX Q.—MISCELLANEOUS COMPARATIVE STATISTICS.—(*Concluded.*)

VI.—Statistics of the Universities in the United States, and the University of Tororto.

University and Address.	Tuition fees.	Other fees.	Total income of University.
		$	
University of Arkansas, Fayetteville	Res. free ; $30 to non-res.	5	103,057
University of California, Berkeley	.....	.....	609,107
University of Southern California, Los Angeles	$62	10-30	32,300
University of Colorado, Boulder	.....	10	90,000
Yale University, New Haven, Conn	$155	.....	776,761
University of Georgia, Athens	Free to res.; $50 to non-res.	15	52,856
University of Idaho, Moscow	Free to res.; $50 to non-res.	.....	52,266
University of Chicago, Chicago, Ill	$120	.....	667,184
University of Illinois, Urbana	.....	24	778,790
Indiana University, Bloomington	$3	1	231,067
University of Iowa, Iowa City	$25	.....	282,278
University of Kansas, Lawrence	.....	.....	227,500
Bowdoin College, Brunswick, Maine	$75	.....	1,436,293
Johns Hopkins University, Baltimore, Md	$150	5	59,919
Harvard University, Cambridge, Mass	$150	.....	179,950
University of Michigan, Ann Arbor	Res. $30 ; non-res. $40.	.....	741,000
University of Minnesota, Minneapolis	$15	.....	631,527
University of Mississippi, University	.....	5	52,545
University of Missouri, Columbia	.....	10	316,969
University of Montana, Missoula	.....	6	50,765
University of Nebraska, Lincoln	Res. free ; non-res. $20.	.....	246,967
University of Nevada, Reno	.....	16	74,098
Dartmouth College, Hanover, N. H	$110	.....	181,422
Princeton University, Princeton, N.J	$150	10	42,247
Cornell University, Ithaca, N.Y	$100-125	.....	365,935
Columbia University, New York, N.Y	$150	12	501,131
Syracuse University, Syracuse, N.Y	$75	33	567,993
University of North Dakota, University	.....	5	64,500
Ohio University, Athens	.....	15	58,400
Oberlin College, Oberlin, Ohio	$75	.....	159,682
University of Oregon, Eugene	.....	13	59,758
University of Pennsylvania, Philadelphia	$150-200	.....	458,179
Brown University, Providence, R.I	$105	45	180,246
University of South Dakota, Vermilion	$12	.....	49,000
University of Virginia, Charlottesville	$75	40	157,159
University of Wisconsin, Madison	Res. free ; non-res. $30.	20	452,456
University of Toronto, Ontario	Average, $36.	20	125,666

APPENDIX R.— ANNUAL REPORT OF THE SCHOOL OF PRACTICAL SCIENCE.

To the Hon. R. Harcourt, M.A., M.P.P., Minister of Education:

Sir,—I have the honor to submit the annual report of the School of Practical Science for the year 1903.

The calendar year not being conterminous with the academic year, this report will cover the second term of the academic year, 1902-03, and the first term of the academic year, 1903-04, except when otherwise stated.

The number of students in attendance was as follows:

In the Regular Departments.	2nd Term. Session 1902-03.	1st Term. Session 1903-04.
I. year	136	180
II. year	105	104
III. year	65	83
IV. year	20	20
Occasional	4	3
	330	390

The fees for the academic year 1902-03 were $24,053.

Of the above amount $1,715 were paid to the Bursar of the University of Toronto for instruction in Mathematics and Biology under the authority of an Order-in-Council, dated January 22nd, 1903; $1,266.20 to the Examiners of the School for the Session 1902-03, under the authority of an Order-in-Council, dated February 3rd, 1899, and the remainder, $21,071.80. to the Honourable the Provincial Treasurer.

The number of regular students who presented themselves for examination at the annual examinations of the academic year 1902-03 was two hundred and eighty-five. Of these two hundred and thirty-three passed.

One candidate for a special certificate passed the necessary examination.

The number of candidates who graduated was fifty-six. The total number of graduates to date is four hundred.

The following statement shows the geographical distribution of the graduates now living:

	Number.	Percentage.
Canada	273	71
United States	102	26
Other Countries	11	3
	386	100

The number of graduates who proceeded to the degree of B.A.Sc. at the University examinations of 1903 was eighteen. The total number of graduates who have received the degree of B.A.Sc. is one hundred and twenty-eight.

Eighteen graduates have received the degree of C.E., two the degree of M.E. (Mining Engineer), three the degree of M.E. (Mechanical Engineer), and two the degree of E.E. in the University of Toronto.

The regular departments of instruction are:

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

The following statement shows the courses of lectures and practical instruction, the instructors, and the number of students taking the various courses:

Subjects Taught by the Faculty of the School of Science.

Subjects.	Instructors.	Number of Students. 2nd Term, Session 1902-1903.	1st Term, Session 1903-1904.
Organic and inorganic chemistry Applied chemistry	W. H. Ellis, M.A., M.B. Professor J. W. Bain, B.A. Sc., Lecturer E. G. R. Ardagh, B.A. Sc, Fellow C. G. Williams, Grad. S.P.S., Fellow F. G. Marriott, Grad. S.P.S	316	375
Geology Assaying Metallurgy Mining and ore-dressing German	A. P. Coleman, M.A., Ph.D., Professor G. R. Mickle, B.A., Lecturer J. G. McMillan, B.A. Sc. Fellow	119	150
Dynamics Strength of materials Theory of construction Machine design Mechanics of machinery Compound stress Hydraulics Thermodynamics and theory of the steam engine French	J. Galbraith, M.A., Professor J. McGowan, B.A., Lecturer R. W. Angus, B.A. Sc., Lecturer H. G. McVean, B.A. Sc., Demonstrator	320	387
Statics Drawing Architecture Plumbing, heating and ventilation Mortars and cements Brick and stone masonry	C. H. C. Wright, B.A.Sc., Professor J. R. Cockburn, B.A.Sc., Fellow A. E. Davison, Grad. S.P.S., Fellow S. B. Wass, Grad. S.P.S., Fellow	307	374
Surveying Geodesy and astronomy Spherical trigonometry Least squares Descriptive geometry	L. B. Stewart, D.T.S., Professor J. L. R. Parsons, B.A., Fellow	309	370
Electricity Magnetism Dynamo-electrical machinery	T. R. Rosebrugh, M.A., Professor H. W. Price, B.A.Sc., Demonstrator H. M. Shipe, Grad. S.P.G., Fellow	166	243

Subjects Taught by the Faculty of Arts.

Subjects.	Instructors.	Number of Students. 2nd Term, Session 1902-1903.	1st Term, Session 1903-1904.
Algebra Euclid Plane trigonometry Analytical geometry Calculus Astronomy	Alfred Baker, M.A., Professor A. T. DeLury, B.A., Associate Professor	241	286
Sound Light, heat, electricity and magnetism Hydrostatics Biology Mineralogy Petrography	James Loudon, M.A., L.L.D., Professor W. J. Loudon, B.A., Associate Professor J. C. McLennan, B.A., Ph.D., Assoc. Prof. C. A. Chant, B.A., Lecturer R. Ramsay Wright, M.A., Professor T. L. Walker, Ph.D., Professor	260	301

GENERAL.

Statistics of Cost and Attendance, etc.

Item.	Average from 1890-91 to 1899-1900 inclusive.	1900-01.	1901-02.	1902-03.
	$ c.	$ c.	$ c.	$ c.
Annual expenditure on maintenance	23,235 92	32,792 98	34,910 73	39,793 77
Annual fees paid into Provincial Treasury	5,021 40	12,356 50	17,430 35	21,071 80
Annual net cost	18,214 52	20,436 48	17,480 38	18,721 97
Teachers' salaries	14,698 00	20,600 00	22,325 00	24,425 00
Students in attendance	138	231	290	341
Annual cost per student	$132	$83	$60	$55
Teachers' salaries per student	107	89	77	72

These figures show that for the last thirteen years the annual cost of the School to the Province has been practically stationary, amounting in round numbers to $18,400. The annual cost per student now stands at the extraordinarily low figure of $55.00.

The expenditure on teachers' salaries per student is at present $72.00.

The economy shown in these figures is, I believe, unexampled in the history of technical education, and they might well be used to cast doubts on the efficiency of the School were it not for the overwhelming evidences to the contrary contained in the list of graduates and their positions published in our Calendar. There can be no doubt, however, that economy has been carried to the dangerous point, and that there ought to be a change of policy in this respect.

In the above computations of cost the interest on capital expenditure, depreciation and insurance, which are the remaining items of the annual cost are not taken into account.

The total expenditure on capital account (buildings and equipment) from 1877 to session 1899-1900, inclusive, was $225,545.34. The annual expenditure since that time have been as follows: 1900-1901, $4,257.60; 1901-1902, $34,927.13; 1902-1903, $118,808.68, making the total expenditure on capital account to the end of 1903, $383,610.75. The great increases in the latter two years are due to the new Chemistry and Mining Building.

The annual expenditure on insurance began in 1895, at which time it amounted to $490; at present it is $870.

Increase of Staff, etc.

The enormous mass of records of practical work which must be checked, marked and classified for examination purposes is proving to be an altogether too heavy task for the present staff. The practical laboratory work required of the staff is also increasing very rapidly. The Council, therefore, has recommended to the Government the appointment of three new demonstrators, two additional fellows, an attendant in the electrical laboratory, and an assistant in the mechanical laboratory.

The recommendations regarding equipment made by the Council of the School in submitting the estimates for 1904 cover such changes and additions as seem to be necessary for the work of the School during the ensuing year.

Chemistry and Mining Building.

Owing to the large increase in the number of students the overcrowded condition of the present building is more pronounced than ever. Every

endeavor ought to be made to have the Chemistry and Mining Building ready for occupation next October. It will probably take a month to remove from the present building and install in the new building the equipment at present in use. Before doing this all the standing equipment, such as chemical tables, fume closets, furnaces, blowpipe tables, etc., with the necessary plumbing, water and gas services, experimental electric wiring, storage batteries, etc., must be in place. The installation of the latter equipment ought to be begun not later than June 1st. It will thus be necessary that all work on the general contracts for building, heating, plumbing, electric lighting, etc., be completed by that date if the building is to be occupied on October 1st. This statement also applies to the Milling Building.

J. GALBRAITH, Principal.

Toronto, December, 1903.

APPENDIX S.—ANNUAL REPORT OF THE PRESIDENT OF THE UNIVERSITY OF TORONTO.

To His Honor the Hon. William Mortimer Clark, Lieutenant-Governor of Ontario.

May it please your Honor:

I have the honor to submit the following report for the year ending June 30th, 1903:

The Teaching Staffs.

The following is a tabular statement of the numbers engaged in teaching during the year in the Faculties named. These numbers include the Arts staffs of University College and Victoria College:

	Arts.	Medicine.	Applied Science.
Professors and Associate-Professors	42	33	6
Lecturers and Demonstrators	18	13	7
Instructors and other Assistants	23	12	8
	83	58	21

Changes in the Staffs.

The following paragraphs contain notes of the more important resignations, appointments and promotions in the various Faculties:

In the Department of English, Mr. D. R. Keys, M.A., has been promoted to the rank of Associate-Professor of Anglo-Saxon.

In the Department of French, Mr. J. H. Cameron, M.A., has been promoted to the rank of Associate-Professor.

Mr. W. S. Milner, M.A., formerly Lecturer in Latin, has been promoted to an Associate-Professorship in Ancient History.

Dr. Uzziel Ogden, after fifty years of continuous medical teaching in the Toronto School of Medicine and the University of Toronto, has resigned the Professorship of Gynaecology, retaining the rank of Professor Emeritus.

On October 3rd, 1902, Dr. Bertram Spencer, Professor of Medical Jurisprudence and Associate-Professor of Clinical Surgery, was removed by death.

Dr. J. F. W. Ross has been promoted from an Associate-Professorship to the rank of Professor of Gynaecology.

Students in Arts, Medicine and Applied Science.

Arts.		
(1) B.A. course :		
Regular	748	
Occasional	115	
Graduate	30	
(2) Ph.D. course	14	
		907
Medicine.		
Regular	432	
Occasional	62	
		494
***Applied Science.**		
Regular	337	
Occasional	4	
		341
		1,742

Students in Affiliated Colleges.

Ontario Agricultural College :		
*Regular students	299	
Royal College of Dental Surgeons	211	
Ontario College of Pharmacy	275	
†Toronto College of Music (proceeding to degree of Mus. Bac.)	1	
†Toronto Conservatory of Music (proceeding to degree of Mus. Bac.)		
		786
Total		2,528

*In addition to the above, 429 were enrolled as occasional students and as students taking short courses.

†In addition to the above, 500 were enrolled in the Toronto College of Music and 1,300 in the Toronto Conservatory of Music, as students taking courses leading to a college diploma or certificate.

Candidates Examined.

Arts	1,000
Ph.D.	4
Medicine	465
Law	20
Applied Science and Engineering	324
Pedagogy	2
Agriculture	16
Dentistry	121
Pharmacy	53
Music	202
Physical Training	1
Household Science	2
Total	2,210

Degrees Conferred.

LL.D. (Hon.)	4
Mus. Doc. (Hon.)	1
Ph.D.	4
M.A.	26
B.A.	149
M.D.	1
	82
LL.B.	4
	53
E.E.	1
B.A. Sc.	17
	16
D. Paed.	3
B. Paed.	1
Phm. B.	53
Total	415

Diplomas and Certificates.

Engineering	51
Local Examination in Music	194
Licentiate in Music	1
Physical Culture	
	247

New Courses of Study.

In the Arts Department of Modern Languages the curriculum has been revised for the purpose of allowing increased options in the direction of specialization in Teutonic and Romance languages respectively, at the same time providing a course of study for candidates desiring to obtain the special-

ists' certificate of the Education Department of Ontario.,The specialization referred to, which begins in the second year of the course, is, however, not exclusive. In view especially of the extensive employment of Spanish as a commercial language, this subject has been added as an option in the General Course leading to the B.A. degree.

In the Departments of Physical and Natural Science the courses have been re-arranged. The various graduating departments of Biology, Biological and Physical Science, Physics, Chemistry, and Geology and Mineralogy, have now a common course for the first year, specialization in any science being postponed till the beginning of the second year. Further the curriculum in each of these departments has been arranged with a view to affording the broadest scientific foundation for the more specialized work of the third and fourth years.

In response to the demand for instruction in Household Science, a curriculum of study extending over four years has been prescribed, leading to the degree of Bachelor of Household Science. A diploma in this subject is also granted upon the completion of a course extending over two years.

Owing to the importance of Forestry as regards agriculture, lumbering, and the conservation of the Crown forests, the Senate has passed a Statute establishing a School of Forestry and prescribing the following curriculum in the subject, leading to a diploma:

Entrance: Candidates for a Diploma must have passed in the subjects of Junior Matriculation, omitting Latin; or be of the third year's standing in the Ontario Agricultural College; or present satisfactory certificates of standing from another University.

The course shall extend over three winter, and two summer, sessions. The subjects of instruction and examination shall be as follows:

First year: Elementary Biology, with Laboratory Work; Elementary Chemistry, with Laboratory Work; Elementary Physics; Elementary Geology: English and Mathematics of the First Year Course in Arts; Scientific French and German.

Second Year: Morphology and Physiology of Phanerogamic Plants; Forest Botany; Forest Zoology; Geology and Mineralogy, with the origin and nature of Soils; General Principles of Forestry, including Forest Physiography; Meteorology; Sylviculture; Practical Physics; Surveying and Drawing, and Forest Measurements.

The Summer Session of the Second Year shall be devoted to Practical Work in the Forest, in illustration of the foregoing subjects.

Third Year: Cryptogamic Botany; Diseases of Trees, due (1) to physical conditions, (2) to attacks of plants and animals; physical characteristics and commercial utilization of the various kinds of woods; Forestry, including the administration and protection of Forests, Lumbering, Construction of Forest Roads; Administration of the Forest resources of Ontario; Provincial Forest Laws and Regulations.

The Summer Session of the Third Year shall be devoted to Practical Work in the Forest, in illustration of the foregoing subjects.

The Statutes referred to above at present await the sanction of the Lieutenant Governor-in-Council.

As supplementary to the above statutes, and embodying an understanding entered into with the Ontario Agricultural College, a resolution was passed by the Senate providing for such courses on instruction in that institution as might be found advisable in the interests of agricultural forestry.

Research Work.

In my last report I outlined the history of the movement in favor of Research Work, from its inception in 1883 to the establishment of the degree

of Ph.D. for research in 1897. I am more than ever convinced that the encouragement of research is a vital matter as regards the future development of the University and the promotion of higher ideals in University work. I am gratified to report that during the past year satisfactory progress in this direction has been made, as will be seen by reference to the list of published papers given in the Appendix.

When the degree of Ph.D. was instituted in 1897, it was found necessary to restrict its application to the Scientific Departments, Physiology, Political Science and Oriental Literature. I consider it highly desirable that the scheme should be extended to include the remaining Arts Departments, viz., Mathematics, Classics, Modern Languages, and History. In so far as the language departments are concerned, this extension would be facilitated by the re-organization of the Department of Comparative Philology.

Special University Lectures.

The usual course of Saturday popular lectures was delivered in January and February by Professor T. L. Walker, Professor W. H. Fraser, Professor W. J. Alexander, Rev. C. W. Gordon, Dr. Albert Ham, and Dr. Sidney Lee.

In addition to the above, a special lecture on "La Renaissance en France," was delivered by M. Germain Martin, of the University of Paris.

From the report of the Librarian, which is appended, it will be seen that the total accumulation of books in the Library since the destruction of the former Library by fire in 1890, now amounts to 74,841, and upwards of 18,500 pamphlets. The number of volumes added during the year was 2,504, of which 464 were presented to the Library.

In my report for last year I called attention to the absence in the present building of reading-room accommodation for members of the Faculties, and to the insufficiency of the rooms provided for administration purposes. I regret to say that nothing has been done to remedy these defects. At the present rate of increase the stack-room accommodation of the building will be exhausted in the near future, and provision for these necessities by an extension of the building cannot be much longer delayed.

The necessity for an increased annual appropriation for the Library, has now become urgent. The total annual appropriation for all purposes, exclusive of salaries, is at present $6,000. To meet the demands of the various departments, and to enable research students to prosecute their work satisfactorily, the appropriation should be increased to at least $10,000, as recommended by the Librarian. This sum is a very moderate one, as compared with the amounts at the disposal of universities of similar standing in the United States, as will be seen by reference to the Appendix.

Geological and Mineralogical Museum.

In the Science Building in course of erection on College street, a floor space of 4,000 square feet is allotted for museum purposes in Geology and Mineralogy. This accommodation is quite insufficient for the collections now in the possession of the University, and it will be necessary to take immediate steps to provide additional space. Memoranda on the subject, from the professors of Geology and Mineralogy, will be found in the Appendix.

New Buildings.

The Medical Building which was in process of erection at the close of the academic year 1901-2, has since then been completed, and occupied by the Medical Faculty and the Arts Department of Physiology. Accommo-

dation has also been provided in this building for the bacteriological and chemical laboratories of the Provincial Board of Health. The building is three storeys in height, with an additional storey and sub-basement in the wings, and has a total floor space of 64,830 square feet. It contains two large lecture-rooms, one affording accommodation for 300, and the other for 200, students. The laboratories are arranged on the unit system, a unit room being 30 feet long by 23 feet wide, lighted on its long face by two large windows. These units may be combined, so as to form large laboratories, or subdivided for the purpose of larger or smaller classes. A number of small rooms, with accommodation for one or two workers, have been provided for students engaged in research.

The building in course of erection for the purposes of the Faculty of Applied Science and the Arts Department of Mineralogy and Geology is as yet unfinished. It is extremely desirable that every effort should be made towards its completion before the opening of the sessions of 1904-5, as the work of the institution is greatly hindered by the overcrowding in the building now occupied by the Faculty of Applied Science.

Building Requirements.

In my last report I expressed the opinion that "the erection of a new Physical Laboratory is the most urgent need of the University at the present time, and cannot be longer delayed without seriously impairing the efficiency of this important department." Since the time referred to the disabilities under which the work of the department has been conducted have so multiplied that action in the matter can no longer be delayed. The Department of Physics provides instruction to students, not only in Arts, but also in Medicine and Engineering. During the present year instruction in Physics has also been prescribed for students in Dentistry and Household Science. For the larger classes the lecture-room accommodation is quite inadequate. There are at the date of this report four classes, containing respectively 180, 186, 195, and 260 students. The Physics lecture-room is seated for only 135 students, and, to show how serious the situation has become since last Session (1902-3), it may be stated that, whereas it was necessary last year to divide one class and repeat the lecture, this year the increased numbers render such a division necessary in the case of four classes.

In the practical work the situation is even more serious. The total number of students to be provided for this year in the laboratories is 403, the accommodation for whom was found so inadequate that it has been supplemented by utilizing the space between the cases in the apparatus room, and by resorting to four rooms in the basement. Such temporary make-Department from the Main Building, would leave considerable space available for the work of other departments, especially that of Psychology, which shifts as these, however, cannot continue to be used in fairness either to instructors or students.

Some idea of the inadequacy of the accommodation may be formed by comparing the total floor space available in Physics with that allotted to other scientific departments in the University.

	Floor Space (Square feet)
Physics	9,225
Biology	25,000
Chemistry	31,372
Physiology	17,700
Mineralogy and Geology in the new building	19,000

In fact, the accommodation in the Department of Physics is so limited that it is not only insufficient for proper work, but is positively insanitary.

The erection of a separate building for Physics, and the removal of the is at present hampered for want of sufficient laboratory and lecture-room accommodation.

Relatively to the other branches of Science, the Department of Botany has hitherto not received the encouragement which the importance of the subject demands. To place the department on an efficient basis the erection of a Botanical Laboratory, with Plant Houses attached, is absolutely necessary. While this provision would be a valuable adjunct to the courses in Forestry prescribed by the Senate, I wish to emphasize the fact that, apart altogether from this consideration, the buildings in question are necessary for the proper instruction of students in Natural Science in the Faculty of Arts. The erection of these buildings is the more desirable in view of the practicability of utilizing them for the training of those Public School teachers, who are required to undertake the work of nature study at present prescribed by the regulations of the Educational Department.

I am gratified to report that the estimated amount required for the erection of a Convocation Hall has been secured, upwards of $51,000 having been subscribed for this purpose by the Alumni and friends of the University, and $50,000 granted by vote of the Legislature.

Other Requirements.

In my report for the year 1901-2 I directed attention to the desirability of providing medical supervision for students engaging in athletic exercises and pointed out the serious consequences which are liable to arise through the lack of such supervision. Nothing has been done in this direction, and I would again urge the desirability of appointing a Medical Director for this purpose.

The art of public speaking has hitherto received little or no attention in this University. The importance of the subject demands that in the near future some means should be provided for systematic training at least in the fundamental principles of the art.

I desire to direct attention to the inadequacy of the staff in the Faculty of Applied Science relatively to the amount of ground to be covered in the teaching of the various branches and to the number of students now in attendance. The staff consists of six professors, seven lecturers, and eight instructor and other assistants, while the attendance numbers 341. Comparison with other engineering schools will show that the proportion of instructors to students is far below what obtains in institutions of similar character elsewhere.

As a consequence, the members of the staff are overworked, and have no time to engage in research work in Applied Science. The strength of the staff should be largely increased, and amongst the new appointments should be professorships of Mining and Metallurgy. In addition to these, a professorship in Naval Architecture should be established in response to the demand for instruction in this branch which has arisen from the growth of the shipbuilding trade in Canada. On this point, as well as with regard to Mining and Metallurgy, I have already made representations in communications addressed to the Hon. the Minister of Education.

Finances.

The following figures exhibit the total revenues and expenditures for the three Faculties of Arts (University and University College), Medicine, and Applied Science and Engineering.

	Revenue.	Expenditure.
	$ c.	$ c.
Arts	161,811 07	179,488 [illegible]
Medicine	40,014 49	40,014 49
Applied Science and Engineering	12,774 97	12,774 97

Details of these figures will be found in the Addendum. The deficit in Arts was met by a Legislative grant.

The figures relating to Applied Science and Engineering are extracted mainly from the Public Accounts of the Province, the financial administration of the School of Practical Science being directly under Government control. The net cost of the School to the Province would appear to be about $18,721.97.

I have the honor to be, Sir,
Your obedient servant,

J. Loudon,
President.

Toronto, March 7th, 1904.

ADDENDUM A.—REPORT OF THE DEAN OF THE FACULTY OF ARTS.

University of Toronto,
February 3rd, 1904.

James Loudon, Esq., LL.D.,
President of the University of Toronto:

Sir,—I beg to submit herewith a detailed list, for the academic year 1902-3 of the personnel of the teaching staff of the Faculty of Arts of the University of Toronto, and also statistics as to the attendance of students in the various subjects taught by the members of the staff. As will be seen, certain classes are taken advantage of by students of the Faculties of Medicine and Applied Science.

Staff, 1902-03.

Faculty of Arts.

Physics.
Professor, James Loudon, M.A., LL.D.
Associate-Professor, W. J. Loudon, B.A.
Associate-Professor, J. C. McLennan, B.A., Ph.D.
Lecturer, C. A. Chant, M.A., Ph.D.
Assistant in Physical Laboratory, G. R. Anderson, M.A.
Lecture Assistant, E. F. Bunton, B.A.
Mechanical Assistant, J. S. Plaskett, B.A.

Mathematics.
Professor, Alfred Baker, M. A.
Associate-Professor, A. T. DeLury, M.A.
Special Lecturer, J. C. Fields, B.A., Ph.D.
Fellow, E. F. Burton, B.A.,

Chemistry:
Professor, W. R. Lang, D.Sc.
Associate-Professor, W. L. Miller, B.A., Ph.D
Lecturer, F. B. Allen, M.A., Ph.D.
Lecturer, F. B. Kenrick, M.A., Ph.D.
Assistant, Miss C. C. Benson, B.A., Ph.D.
Assistant, C. M. Carson, B.A.
Junior Assistants, Alfred Tingle, B.Sc., Ph.D., G. B. Smith, B.A.

Biology:
Professor, R. Ramsay Wright, M.A., B.Sc., LL.D.
Lecturer in Biology, W. H. Piersol, B.A., M.B.
Lecturer in Zoology, B. A. Bensley, B.A., Ph.D.
Lecture Assistant in Biology, C. M. Fraser, B.A.
Lecturer in Botany, J. H. Faull, B.A.
Class Assistant in Botany, R. B. Thompson, B.A.
Class Assistants in Biology, A. H. Adams, B.A., M. H. Embree, B.A., A. C. Hendrick, B.A., M.B., W. J. McCollum, M.B., E. A. McCulloch, B.A., G. W. Ross, B.A.

Physiology:
Professor, A. B. Macallum, M.A., M.B., Ph.D.
Demonstrator, F. H. Scott, B.A., Ph.D.

Geology:
Professor, A. P. Coleman, M.A., Ph.D.
Lecturer, W. A. Parks, B.A., Ph.D.

Mineralogy and Petrography:
Professor, T. L. Walker, M.A., Ph.D.

Comparative Philology:
Professor, Maurice Hutton, M.A., LL.D.

Modern History:
Professor, G. M. Wrong, M.A.

Political Economy:
Professor, J. Mavor.
Lecturer, S. M. Wickett, B.A., Ph.D.
Mackenzie Fellow in Political Science, E. H. Oliver, M.A.
Mackenzie Fellow in Political Science, F. P. Clappison, B.A.

Philosophy:
Professor of History of Philosophy, J. G. Hume, M.A., Ph.D.
Associate-Professor, A. Kirschmann, M.A., Ph.D.
Lecturer, F. Tracy, B. A., Ph.D.
Lecturer, A. H. Abbott, B.A.
Laboratory Assistant, Miss M. Downing, B.A.

Italian and Spanish:
Professor, W. H. Fraser, M.A.
Special Lecturer in Spanish, F. J. A. Davidson, B.A., Ph.D.
Instructor in Italian, E. J. Sacco.

Roman Law, Jurisprudence and History of English Law:
Professor, A. H. F. Lefroy, M.A.

Constitutional and International Law and Constitutional History:
Professor, J. McGregor Young, M.A.

The following tables exhibit the numbers attending lectures in University subjects, together with the number of those taking the practical work in the laboratories:

Mathematics.

		Pass.	Pass and Honors.	Honors.
Arts	First Year	146		37
	Second Year			58
	Third Year			10
	Fourth Year	23		9
School of Practical Science	First Year		137	
	Second Year			105
	Totals	169	137	220

Physics.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—First Year	30	68		24
Second Year			75	31
Third Year	12	17		21
Fourth Year			7	7
Ph.D. Students				1
Medicine—First Year			98	
School of Practical Science—First Year			85	85
Second Year			106	106
Third Year				55
Totals	42	85	371	333

Biology.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—First Year	108	37		37
Second Year			15	15
Third Year			15	15
Fourth Year			8	8
Medicine—First Year		98		98
Second Year			116	116
School of Practical Science—First Year		2		2
Totals	108	137	154	291

Physiology.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—Second Year			15	15
Fourth Year			8	8
Medicine—First Year			98	
Second Year			116	116
Totals			237	139

Chemistry.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—First Year		77		46
Second Year	6		43	43
Third Year			22	22
Fourth Year			9	9
Ph. D. Students				2
Medicine—First Year		95		95
Second Year			118	118
School of Practical Science—Third Year			3	
Totals	6	172	295	335

Geology and Mineralogy.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—Second Year	75	17	.....	17
Third Year	.....	.....	6	6
Fourth Year	.....	.....	6	6
Ph.D. Students	.....	.....	.....	2
Totals	75	17	12	31

Philosophy.

	Logic.	Psychology.		History of Philosophy.	Philosophy.
	Pass.	Pass.	Laboratory.	Pass.	Honors.
Second year	130	137	.....	.....	21
Third year	.....	.....	26	.....	26
Fourth year	.....	.....	27	11	27
Graduate students	.....	.....	5	.....	5
Ph.D. students	.....	.....	3	.....	3
Totals	130	137	91	11	82

Political Science and History.

	Economics.		History.		Constitutional History.		Law.
	Pass.	Honors.	Pass.	Honors.	Pass.	Honors.	Honors.
Second year	.....	37	73	50	.....	35	.....
Third year	.....	22	30	46	30	22	22
Fourth year	34	26	15	57	34	26	26
Graduate students	.....	8	.....	.....	.....	.....	.....
Totals	34	93	118	153	64	83	48

Italian, Spanish and Phonetics.

	Italian.	Spanish.	Phonetics.
	Honors.	Honors.	Honors.
First year	43	18	51
Second year	25	8	.....
Third year	14	11	.....
Fourth year	9	2	.....
Graduate students	.....	.....	.....
Totals	91	41	51

I also subjoin statistics as to the courses selected by regular students proceeding to a degree in Arts in the University. The following table indi-

cates whether the students in question are enrolled in University College or Victoria College:

	First Year.		Second year.		Third year.		Fourth year.	
	U.C.	V. C.	U.C.	V.C.	U.C.	V.C.	U.C.	V C.
Classics	12	8	12	5	9	1	14	1
English and History	11	5	9	1	2	1	16	1
Modern Languages	33	8	24	9	18	4	2	10
Oriental Languages	.....	.....	1	.....	2	2	.....	1
History	.....	.....	2	.....	.....	.....	.....	.....
Political Science	.....	.....	24	4	19	3	21	5
Philosophy	.....	.....	14	8	15	10	12	7
Mathematics and Physics	15	4	15	5	11	4	12	3
Physics and Chemistry	7	3	3	1	3	..	1	.....
Chemistry and Mineralogy	11	3	3	4	4	.....	3	2
Natural Science, Div. I	.....	.....	.....	.....	7	2	8	.....
Natural Science, Div. II	9	.....	7	.....	3	.....	2	.....
Biological and Physical Science	23	2	5	2	1	3	.....	.....
General Course	56	21	35	17	16	15	14	10

I am, Sir, Yours faithfully,

(Sgd.) R. RAMSAY WRIGHT,
Dean of the Faculty of Arts.

ADDENDUM B.—REPORT OF UNIVERSITY COLLEGE.

PRINCIPAL, MAURICE HUTTON, M.A., LL.D.

Greek:
Professor, Maurice Hutton, M.A., LL.D.
Lecturer, Adam Carruthers, M.A.

Latin:
Professor, John Fletcher, M.A., LL.D.
Associate-Professor of Ancient History, W. S. Milner, M.A.
Lecturer, G. W. Johnston, B.A., Ph.D.

English:
Professor, W. J. Alexander, B.A., Ph.D.
Associate-Professor of Anglo-Saxon, D. R. Keys, M.A.

German:
Professor, W. H. Vander Smissen, M.A.
Lecturer, G. H. Needler, B.A., Ph.D.
Instructor, P. Toews, M.A., Ph.D.

French:
Professor, John Squair, B.A.
Associate-Professor, John Home Cameron, M.A.
Instructor, St. Elme de Champ, B.es L.

Oriental Literature:
Professor, J. F. McCurdy, Ph.D., LL.D.
Lecturer, R. G. Murison, M.A., Ph.D.

Ethics:
Professor, J. G. Hume, M.A., Ph.D.

The following table exhibits the number of students in attendance during the session:

FIRST YEAR:		
Regular	170	
Occasional	16	
		186
SECOND YEAR:		
Regular	131	
Occasional	17	
		148
THIRD YEAR:		
Regular	119	
Occasional	19	
		138
FOURTH YEAR:		
Regular	113	
Occasional	10	
		123
Graduates		21
Ph. D		3
		619

The following table exhibits the number of students in attendance upon lectures in subjects of the General and Honor Courses:

GENERAL COURSE.

	Greek.	Latin.	Ancient History.	English.	German.	French.	Orientals.	Ethics.
First year	40	144	52	134	38	62	37	.....
Second year	35	71	.....	111	42	51	11	.....
Third year	16	18	.....	86	12	17	12	35
Fourth year	2	14	.....	71	5	7	1	.....
Total	93	247	52	402	97	138	61	35

HONOR COURSE.

	Greek.	Latin.	Ancient History.	English.	German.	French.	Orientals.	Ethics.
First year	16	23	16	64	49	70	..	.....
Second year	16	18	34	39	24	30	1	.....
Third year	11	11	11	35	19	20	2	19
Fourth year	18	17	16	41	16	18	2	.....
Ph. D. students	2	.....	1	.....	.....	.....	1	.....
Totals	63	69	78	179	108	138	6	19

ADDENDUM C.—VICTORIA UNIVERSITY.

Rev. Nathaneal Burwash, S.T.D., LL.D., F.R.S.C., President.

Rev. Alfred H. Reynar, M.A., LL.D., Dean of the Faculty of Arts, William Gooderham, Professor of English Literature.

A. R. Bain, M.A., LL.D., Nelles Professor of Ancient History.

Rev. E. I. Badgley, M.A., LL.D. Egerton Ryerson Professor of Mental and Moral Philosophy.

Rev. Francis Huston Wallace, M.A., D.D., Dean of Faculty of Theology, Geo. A. Cox Professor of Biblical Greek.

A. J. Bell, M.A., Ph.D., (Bresl.) Macdonald Professor of the Latin Language and Literature.

Rev. John Burwash, M.A., D.Sc., LL.D., H. A. Massey Professor of English Bible.

L. E. Horning, M.A., Ph.D., (Goettingen), Professor of German and Old English.

Rev. J F. McLaughlin, B.A., B.D., Professor of Oriental Languages and Literature.

J. C. Robertson, B.A., W. E. H. Massey Professor of the Greek Language and Philosophy.

Pelham Edgar, Ph.D., Eliza Gooderham Professor of the French Language and Literature.

A. L. Langford, M.A., Associate-Professor of the Greek Language and Literature.

A. E. Lang, M.A., Associate-Professor of the German Language and Literature.

E. Masson, Instructor in French.

A. P. Misener, M.A., Lecturer in Oriental Languages and Literature.

The following table exhibits the number of Arts students in attendance during the session 1902-03.

First Year :			
Regular	72		
Occasional	15		
		87	
Second Year :			
Regular	55		
Occasional	22		
		77	
Third Year :			
Regular	45		
Occasional	14		
		59	
Fourth Year :			
Regular	43		
Occasional	2		
		45	
Graduates :			
Occasional	9		
Ph. D	3		
		12	
			280

ADDENDUM D.— FACULTY OF MEDICINE.

Dean of the Faculty of Medicine, Professor R. A. Reeve, M.D., LL.D

Professores Emeriti:

James Thorburn, M.D., M. H. Aikins, M.D., W. W. Ogden, M.D., J. H. Richardson, M.D., Uzziel Ogden, M.D.

Professor of Surgery and Clinical Surgery:
I. H. Cameron, M.B., Tor., F.R.C.S., Eng.

Associate-Professor of Surgery and Clinical Surgery:
G. A. Peters, M.B., Tor., F.R.C.S., Eng.

Associate-Professor of Clinical Surgery:
A. Primrose, M.B., C.M., Edin., H .A. Bruce, M.B., Tor., F.R.C.S,, Eng., W. Oldright, M.A., M.D., Tor., F. N. G. Starr, M. B., Tor.

Lecturer in Clinical Surgery:
Oldright, M.A., M.D., Tor., F. N. G. Starr, M.B., Tor.

Professor and Director of the Anatomical Department:
A. Primrose, M.B., C.M., Edin.

Associate-Professor of Anatomy:
H. Wilberforce Aikins, B.A., M.B., Tor.

Demonstrator of Anatomy:
F. N. G. Starr, M.B., Tor.

Assistant Demonstrator of Anatomy:
C. L. Starr, M.B., Tor., W. J. McCollum, M.B., Tor., W. J. O. Malloch, B.A., M.B., Tor., S. H. Westman, M.B., Tor., W. H. Piersol, B.A., M.B., Tor., E. R. Hooper, B.A., M.B., Tor., W. J. Wilson, M.B., Tor., A. C. Hendrick, B.A., M.B., Tor., A. J. MacKenzie, B.A., M.B., Tor., D. McGillivray, M.B., Tor.

Professor of Medicine and Clinical Medicine:
A. McPhedran, M.B., Tor.

Associate-Professor of Clinical Medicine.
W. P. Caven, M.B., Tor., W. B. Thistle, M.D., Tor.

Lecturers in Medicine and Clinical Medicine:
R. J. Dwyer, M.B., Tor., R. D. Rudolf, M.D., C.M., Edin., M.R.C.P. Lond.

Lectures in Clinical Medicine:
G. Boyd, B.A., M.B., Tor., A. R. Gordon, M.B., Tor., G. Chambers, B.A., M.B., Tor.

Demonstrator in Clinical Medicine:
W. Goldie, M.B., Tor.

Professor of Pathology and Bacteriology:
J. J. Mackenzie, B.A., M.B., Tor.

Associate-Professor of Pathology and Bacteriology:
J. A. Amyot, M.B., Tor.

Laboratory Assistant in Bacteriology:
T. D. Archibald, M.B., Tor.

Demonstrators in Pathology:
C. Silverthorn, M.B., Tor., C. J. Wagner, M.B., Tor.

Assistant-Demonstrator in Pathology:
T. D. Archibald, M.B., Tor., M. M. Crawford, M.B., Tor.

Professor of Materia Medica and Therapeutics:
J. M. MacCallum, B.A., M.D., Tor.

Associate-Professor of Pharmacology and Therapeutics:
C. F. Heebner, Phm.B., Tor.

Professor of Gynaecology:
J. F. W. Ross, M.B., Tor.

Professor of Obstetrics:
A. H. Wright, B.A., M.D., Tor.

Associate-Professor of Obstetrics and Pediatrics:
H. T. Machell, M.D., Tor.

Demonstrator of Obstetrics:
K. C. McIlwraith, M.B., Tor.

Professor of Ophthalmology and Otology:
R. A. Reeve, B.A., M.D., LL.D., Tor.

Associate Professor of Ophthalmology and Otology:
G. H. Burnham, M.D., Tor., F.R.C.S., Edin.

Professor of Laryngology and Rhinology:
G. R. McDonagh, M.D., Tor.

Professor of Hygiene:
W. Oldright, M. A., M.D., Tor.
Professor of Toxicology:
W. Ellis, M.A., M.B., Tor.
Lecturer on Medical Jurisprudence:
Hon. David Mills, LL.B., K.C.
Extra-Mural Professors of Mental Diseases:
Daniel Clark, M.D., Tor., N. H. Beemer, M.B., Tor.
Professor of Physics:
James Loudon, M.A., LL.D., Tor.
Lecturer on Physics:
C. A. Chant, M.A., Tor., Ph.D., Harvard.
Professor of Chemistry:
W. R. Lang, D.Sc., Glasg.
Associate-Professor of Chemistry:
W. L. Miller, B.A., Tor., Ph.D., Munich.
Lecturers in Chemistry:
F. B. Kenrick, M.A., Tor., Ph.D., Leipzig, F. B. Allan, M.A., Ph.D. Tor.
Professor of Biology:
R. Ramsay Wright, M.A., B.Sc., Edin., LL.D., Tor.
Demonstrator in Biology:
B. A. Bensley, B.A., Tor., Ph.D., Col.
Professor of Physiology:
A. B. Macallum, M.A., M.B., Tor., Ph. D., John Hopkins.
Demonstrator in Physiology:
F. H. Scott, B.A., Ph.D., Tor.
Assistant Demonstrators:
W. J. O. Malloch, B.A., M.B., Tor., S. W. Westman, M.B., Tor., A. C. Hendrick, B.A., M.B., Tor.

The following table exhibits the number of students registered as in attendance upon the lectures given by the staff of the Faculty of Medicine:

Graduate Students	3	Students in First Year	102
Students in Fourth Year	96	Occasional Students	62
Students in Third Year	112		
Students in Second Year	119	Total	494

ADDENDUM E.—APPLIED SCIENCE AND ENGINEERING.

Dean of the Faculty, Principal Galbraith, M.A., LL.D.

Chemistry:
Professor, W. H. Ellis, M.A., M.B.
Lecturer, J. W. Bain, B.A.Sc.
Fellow, E. G. R. Ardagh, B.A.Sc.
Lecture Assistant, M. C. Boswell, B.A.Sc.
Geology, Mining and Metallurgy:
Professor, A. P. Coleman, Ph.D.
Lecturer, G. R. Mickle, B.A.
Fellow, J. G. McMillan, B.A.Sc.
Applied Mechanics:
Professor, J. Galbraith, M.A.
Lecturer, J. McGowan, B.A., B.A.Sc.
Lecturer, R. W. Angus, B.A.Sc.
Demonstrator, H. G. McVean, B.A.Sc.
Fellow, W. C. Tennant, B.A.Sc.

Architecture and Drawing:
Professor, C. H. C. Wright, B.A.Sc.
Fellow, A. H. McBride, Grad. S.P.S.
Fellow, W. E. Wagner, B.A.Sc.
Surveying and Geodesy:
Professor, L. B. Stewart, D.T.S.
Fellow, E. V. Neelands.
Electricity:
Professor, T. R. Rosebrugh, M.A.
Demonstrator, H. W. Price, B.A.Sc.
Fellow, M. V. Sauer, B.A.Sc.
Mathematics:
Professor, Alfred Baker, M.A.
Associate-Professor, A. T. DeLury, M.A.
Fellow, E. F. Burton, B.A.
Physics:
Professor, James Loudon, M.A., LL.D.
Associate-Professor, W. J. Loudon, B.A.
Associate-Professor, J. C. McLennan, B.A., Ph.D.
Lecturer, C. A. Chant, M.A., Ph.D.
Mechanical Assistant, J. S. Plaskett, B.A.
Lecture Assistant, G. R. Anderson, M.A.
Biology:
Professor, R. Ramsay Wright, M.A., B.Sc., LL.D.
Mineralogy and Petrography:
Professor, T. L. Walker, M.A., Ph.D.

NUMBER OF STUDENTS BY YEARS.

First year	143
Second year	106
Third year	66
Fourth year	22
Occasional	4
	341

NUMBER OF STUDENTS BY DEPARTMENTS.

1. Civil Engineers	105
2. Mining Engineers	59
3. Mechanical and Electrical Engineers	163
4. Architecture	2
5. Applied Chemistry	12
	341

ADDENDUM F.—THE LIBRARY.

The Librarian of the University of Toronto begs to submit his annual report for the year ending June, 30th, 1903.

1. The number of bound volumes added to the Library during the year was 2,504, of which 464 were presentations, making the total contents of the Library 74,841 volumes. The number of pamphlets added during the year was 1,560. The total number of pamphlets, of which no accurate account was kept until the last few years, now exceeds 18,500.

2. During the session 1902-3 the average daily attendance of readers is estimated at 68. The largest number counted was 130, in the morning of April 17th. The statistics of the use of books by students are as follows, comparison being made with similar statistics for the previous year:

	1901-2.	1902-3.
Average number of books read in the reading-room during term, per week	766	819
Average number of books taken out by students for the night, per week	320	328
Total number of books taken out by students for periods longer than one night	3,687	2,788

Under the arrangement for giving students access to the stack-room on recommendation of a professor, 34 persons were admitted during the year for various periods. The similar figures for 1901-2 and 1900-1 are 27 and 26, respectively.

3. The number of institutions and learned societies on the exchange list of the Library, to which the University of Toronto Studies and the University Calendar and Examination Papers are sent, is now 348. The Library receives 225 periodicals and serial publications in return, besides University Calendars and many occasional publications from institutions included in the above total of 348, to which the University publications are sent.

4. In the last year's report attention was called to the absence in the present building of reading-room accommodation for members of the Faculties and the insufficiency of the rooms provided for administration purposes. In addition to satisfying these pressing requirements, it will soon be necessary to build an extension to the stack-room. After a careful calculation of the amount of unoccupied shelving in the existing stack-room, it has been found that at the present rate of increase of the collection of books the shelves will be filled up to their full working capacity by June, 1906. Unless an addition to the building is ready for use by that date no more books can be put in the stack-room without upsetting the classification by subjects of the books on the shelves. When it is considered that upwards of 150 persons, both members of the Faculties and students, consult the shelves for the books they want, it is obvious that the work of these readers will be seriously interfered with if new books have to be inserted in the shelves wherever space can be found, irrespective of classification. Before three years have elapsed this course will be necessary unless a new stack-room is built in the meantime. Under the existing arrangement, moreover, only a very small staff of clerks is maintained, the readers admitted to the stack-room being able to find for themselves the books they want. An unclassified stack-room would entail a much larger staff, as every book wanted would have to be found by an attendant. Under the circumstances it would be more economical, as well as far more conducive to the satisfaction of the readers, if the extension of the present building were proceeded with at once, in order that the new stack-room might be ready when needed.

5. The question of the increased annual expenditure on books is also urgent. At present the appropriation out of ordinary income is $2,600. On recommendation of the Library Committee, endorsed by the Senate of the University, the Board of Trustees began in 1897 to supplement this annual sum out of the capital fund, consisting of the insurance money on the old library and the unexpended remainder of the subscriptions to the Library Restoration Fund. The total appropriation each year since 1897 has been raised in this way to $6,000. This sum, divided among the departments and subjects, has not proved sufficient to maintain a good working library. Complaints are frequently made by the professors that new books and periodicals which they ought to see cannot be purchased for lack of funds. It is not surprising that such is the case. The output of books and periodicals is continually increasing in all civilized countries, and the cost of them likewise. With the growth of post-graduate study in the University, a wider field of research is being cultivated, and greater demands in consequence made upon the Library. The universities of the United States of similar standing to the University of Toronto spend much larger sums on their libraries, and thus afford facilities for research to their professors and students that are wanting in the University of Toronto. The sums expended annually on books by the university libraries of this continent are not pub-

lished in every case. The following, however, are recent figures accessible for a few of the chief universities.

Columbia University	$55,000 per annum.
Cornell University (exclusive of Law Library)	40,000 per annum.
California, University of	27,000 per annum.
Wisconsin, University of	17,000 per annum.
Michigan, University of	15,000 per annum.

The Library of the University of Toronto, with a total annual appropriation of $6,000 for books, periodicals, binding, and office expenses other than salaries, must fall behind, and be an ineffective support to the scholarship of the University in comparison with libraries which are able to spend from three times to ten times as much.

All of which is respectfully reported.

(Sgd.) H. H. LANGTON,
Librarian.

ADDENDUM G.— BIOLOGICAL MUSEUM.

Since last year's report considerable progress has been made with the Card Catalogue, and the Vertebrate portion thereof is now complete, with the exception of certain portions of the collection of Reptiles and Fishes.

Various additions have been made, partly by purchase, chiefly by donations. The latter have been, as usual, recorded in the University Calendar.

The additions to the cases for storage and display, referred to in the last report, have not yet been secured. The necessity thereof has only become more apparent in consequence of the museum work of the past year, and I beg to recommend that such cases be procured at a cost of $1,500.

(Sgd.) R. RAMSAY WRIGHT,
Curator.

ADDENDUM H.--MEMORANDA REGARDING GEOLOGICAL AND MINERALOGICAL MUSEUM.

In view of the occupation of the new Science Building next year, it is necessary to consider the space available for museum purposes. Owing to the cutting down of the plan, the wing intended for the Museum was omitted, and it has been arranged that a large lecture-room shall be used temporarily for museum purposes. The ground space thus provided is about 50 by 80 feet. The palaeontological material now on hand, including the collection being transferred to the department by Mr. B. E. Walker, is sufficient to fill the whole space. Other departments require accommodation as well, showing that the present provision is entirely insufficient. To provide for the present collections and future expansion it is desirable that the museum wing should be erected as soon as possible. At present the above material is stored in drawers, but for proper display it will be necessary to provide suitable cases when the new Museum is occupied.

(Sgd.) A. P. COLEMAN,
Professor of Geology.

The mineralogical collections of the University are at present housed partly in the west wing of the Biological Building and partly in the School of Practical Science. In each instance a portion of the collection is arranged

in glass cases in rooms which are at certain times open to the students and public.

In planning the new Chemistry and Mineralogy Building, an attempt was made to provide room for a suitable display of the mineralogical, geological, and palaeontological collection under one roof. Unfortunately, however, owing to the cost of building, it was found necessary to depart from this plan. The museum wing of the original plans was cut out, and does not form part of the present building.

Owing to the absence of proper museum accommodation, it is proposed to crowd the whole of the collection into a single room, barely large enough to contain that part of the specimens now on exhibition. No provision is made for the palaeontological department, or for expansion of the collections already displayed. It is thus apparent that the new building in its present form does nothing towards the solution of the museum problem.

As adequate display of our collections of rocks, fossils, minerals, and ores is demanded by the students, and also by those interested in the development of the mineral wealth of the Province, I feel I cannot too strongly insist upon the necessity of the immediate construction of the museum wing, as indicated in the original plans.

(Sgd.) T. L. WALKER,
Professor of Mineralogy and Petrography.

ADDENDUM J.— UNIVERSITY OF TORONTO STUDIES.

University of Toronto Library,
February 4th, 1904.

To the President of the University of Toronto:

Sir.—I beg to submit the following report of "University of Toronto Studies" for the year 1903.

1. The publication of University of Toronto Studies was commenced in the year 1898 by the aid of a Legislative grant of $500, subsequently increased to $600 per annum. An annual sum is also contributed by the University Library as an equivalent for the use of the Studies as Library exchanges.

2. The following list of published Studies, arranged by years, will show the considerable dimensions to which the Studies have attained on the small sum allowed annually:

In 1898:

History—Review of Historical Publications relating to Canada. Vol. 2, edited by Prof. Wrong and H. H. Langton.

Economics—Public Debts in Canada, by J. Roy Perry.

Psychology—Spatial Threshold of Color, by W. B. Lane and others.

Biology—Gametophyte of Botrychium Virginianum, by E. C. Jeffrey. (Reprint from Canadian Institute Transactions.)

In 1899:

History—Review of Historical Publications relating to Canada. Vol. 3, edited by Prof. Wrong, and H. H. Langton.

Psychology—Contribution to the Psychology of Time, by Messrs. Shaw and Wrinch.

Psychology—Experiments on Time Relations of Poetical Metres, by Messrs. Hurst and McKay.

In 1900:

History—Review of Historical Publications, Vol. 4, edited by Messrs. Wrong and Langton.

History—Preliminary Stages of the Peace of Amiens, by H. M. Bowman.

Psychology—Conceptions and Laws in Aesthetics, by Prof. Kirschmann. Experiments in Colors (2 papers), by Miss Baker and W. J. Dobbie.

Geology—The Huronian of the Moose River Basin, by W. A. Parks.

Physiology—Structure, etc., of Nerve Cells, by F. H. Scott (reprint from Canadian Institute Transactions.)

Physiology—On the Cytology of Non-Nucleated Organisms, by Prof. ..... (reprint from Canadian Institute Transactions.)

Anatomy—Anatomy of the Orang-Outang, by Prof. Primrose (reprint from the Canadian Institute Transactions).

In 1901:

History—Review of Historical Publications, Vol. 5, edited by Messrs. Wrong and Langton.

History—Early Trading Companies of New France, by H. P. Biggar.

Physiology—Observations on Blood Pressure, by R. D. Rudolf.

In 1902:

History and Economics—Review of Historical Publications, Vol. 6, edited by Messrs. Wrong and Langton.

History and Economics—City Government in Canada (3 papers), by Messrs. Wickett and Lighthall.

Psychology—Conception and Classification of Art from a psychological standpoint, by Prof. Kuelpe (University of Wuerzburg). Experiments on Color and Light (3 papers), by Miss Baker and Messrs. Wilson and Abbott.

Biology—On the Identification of Meckelian and Mylohyoid Grooves, etc., by B. A. Bensley.

Biology—Anatomy of the Osmundaceae, by J. H. Faull (reprint from Botanical Gazette).

Geology—Michipicoten Iron Ranges, by Prof. Coleman and A. B. Wilmott.

In 1903:

History and Economics—Review of Historical Publications, Vol. 7, edited by Messrs. Wrong and Langton.

History and Economics—Municipal Government in Ontario (3 papers), by Messrs. Shortt, McKay and Wickett.

Physiology—Chemistry of Wheat Gluten, by G. G. Nasmith (reprint from the Canadian Institute Transactions).

Physical Science—Radioactivity in the Air (2 papers), by Prof. McLennan and Mr. E. F. Burton.

Physical Science—Radioactivity of Metals Generally, by Prof. McLennan and Mr. Burton.

Physiology—The Anglo-Saxon Scop, by L. F. Anderson.

3. Two new series were commenced last year, those in Physical Science and in Philology. Arrangements have been completed for another series, in Chemistry, which will be inaugurated by the publication of several papers in 1904. The pressure upon the funds at the disposal of the Committee becomes more acute with the accession of new departments interested in the publication of Studies. The recommendation that means be found of raising the annual grant of $1,000 can only be repeated from last year's report with emphasis.

All of which is respectfully submitted.

(Sgd.) H. H. LANGTON,
General Editor.

ADDENDUM K—MARINE AND LACUSTRINE BIOLOGICAL STATIONS OF CANADA.

To the President of the University of Toronto:

Sir,—I beg to submit the following report as to the co-operation of members of the University in the scientific work carried on at these stations. The appropriation made by the Board of Trustees has been expended in meeting, in part or in whole, the expenses of workers not provided for out of the Dominion appropriation.

Marine Station at Malpeque.

The laboratory which had been stationed at Canso, N.S., for two seasons was moved to Richmond Bay, P.E.I., in June. Unfortunately, it met with an accident en route, which seriously delayed the summer's work. In addition to myself, who in the absence of the Commissioner of Fisheries, acted as Assistant Director, the University was represented by Prof. J. J. McKenzie and Dr. B. A. Bensley, the latter securing during his stay a large amount of valuable material for class work.

Richmond Bay is the most important centre of the Oyster Fishery of Canada, and consequently the efforts of the workers at the station were chiefly directed to scientific investigations bearing thereon. Prof. McKenzie studied the bacteriology of the Malpeque oysters, and satisfied himself of the absence of those pathogenic microbes which have in recent years caused serious epidemics, and thereby depreciated the value of certain other fisheries.

The investigations on the microscopic life of the sea, which I carried out at Canso, and a report on which is in course of publication, were continued at Malpeque especially in relation to the food of the oyster, and a number of experiments in oyster culture were instituted, which it is hoped to continue during the ensuing season, with the object of combating the decreasing yield of the Canadian oyster fisheries.

Lacustrine Station at Georgian Bay.

Dr. B. A. Bensley, who is in charge, reports as follows:

At the lacustrine station recently established by the Dominion Government at Go-Home, on the Georgian Bay, work was carried on continually during the last summer in two directions, aiming at the construction of an adequate map of the locality for hydrographic purposes, and the collection of data bearing on the natural history of the fishes. This work was greatly facilitated by a grant from the University providing for the expenses of student-assistants.

The construction of a map was entrusted to Mr. T. R. Loudon, assisted by Messrs. R. E. DeLury and J. S. DeLury, under the supervision of Prof. C. H. C. Wright, of the School of Practical Science, and the collection of biological material to Messrs. R. T. Anderson and F. S. Carr, under the supervision of the Director. The collection of fishes begun in the preceding summer was practically completed, and other collections representing the stages of the growth of important fishes and the microscopic life of the water were systematically carried on. Owing to the unfortunate death of Mr. Anderson in the early part of the season, the station lost the services of a skilled and enthusiastic collector, and a part of the work originally planned had to be abandoned.

I am, Sir, Yours faithfully,

(Sgd.) R. RAMSAY WRIGHT,

Professor of Biology.

ADDENDUM L.—FINANCIAL STATEMENT.

I Faculty of Arts.

Receipts—1902-1903

Interest on purchase moneys	$5,882 99
Interest on loans	14,663 45
Interest on debentures	11,192 28
Interest on bank balances (including interest on advances to Medical Faculty)	1,919 15
Rentals, University Park Lands	14,462 90
Rentals, business propertys	3,447 29
Rentals, School of Science site	925 00
Rentals, Biological Building	1,900 00
Rentals, Board of Health	200 00
Rentals, City of Toronto (park)	6,000 00
Sundry earnings	1,691 27
Fees	54,367 08
Legislative grant	7,000 00
Wild land sales	2,014 76
	$125,666 17
Reserve for interest on Retirement Fund, Scholarship and other Trust Funds	8,691 19

Summary of Expenditure, 1902-1903.

1. Salaries and Pensions—	
(*a*) Salaries	90,058 68
(*b*) Pensions	1,883 33
2. Bursar's Office	742 62
3. Registrar's Office	2,756 44
4. Vice-Chancellor's Office	670 00
5. President's Office	446 73
6. Law Costs	1,973 43
7. General Incidentals	1,500 00
8. Insurance	2,388 60
9. Telephones	297 50
10. Convocation expenses	899 25
11. Examinations	6,644 64
12. Library	3,310 03
13. Grounds	2,993 24
14. Main Building	5,141 16
15. Biological Department :	
(*a*) Maintenance of Structure	1,955 75
(*b*) Maintenance of Department	2,133 04
16. Physiological Department	812 00
17. Psychological Department	299 96
18. Mathematics	52 49
19. Political Science	60 01
20. History	149 28
21. Italian and Spanish	20 00
22. Advertising (University)	525 65
23. Incidentals (University)	191 02
24. University College Departments—	
Classics	$133 90
English	100 00
French	26 65
German	6 65
Oriental Literature	25 00
Stationery	44 32
Printing	40 69
Advertising	46 22
Incidentals	134 90
25. Gymnasium and Students' Union	916 75
26. University Press	1,121 05
27. Vaccination Expenses	584 55
28. Educational Association Reception	249 92
29. Grant towards Conversazione	150 00
30. Renovation of Y. M. C. A. Building	159 00
Total Expenditure (exclusive of Departments sustained by Government	$131,644 45

Details.

Salaries.

1. Bursar's Office :	
Bursar	$2,000 00
Accountant	1,300 00
Fees Clerk	600 00
	3,900 00

2. Library :	
Librarian	2,000 00
First Assistant	500 00
Second Assistant	500 00
Cataloguer	326 68
Two Delivery Clerks	380 00
Caretaker	500 00
	4,306 68
3. University of Toronto, general :	
President, (also paid as Professor of Physics)	2,300 00
Vice-President (including arrears in 1902-3)	525 00
Registrar	1,800 00
Registrar's Stenographer	400 00
Bedell (with free house)	600 00
Architect	100 00
Janitor	450 00
Engineer (with rooms and fuel)	576 00
Fireman (salary at $35 per month for 8 months)	280 00
Carpenter	620 00
Cleaners	480 00
Messenger	160 00
	8,291 00
4. Pensions :	
E. J. Chapman	1,800 00
J. M. Hirschfelder	83 33
	1,883 33
5. Teaching Staff, etc., University of Toronto :	
(*a*) Modern History and Ethnology :	
Professor	3,200 00
(*b*) Political Science :	
Professor	3,200 00
Professor of Constitutional and International Law and Constitutional History	1,500 00
Professor of Roman Law, Jurisprudence and History of English Law	750 00
Lecturer (sessional)	1,000 00
	6,450 00
(*c*) Mathematics :	
Professor	3,200 00
Associate Professor	1,800 00
Special Lecturer	1,000 00
Fellow	500 00
	6,500 00
(*d*) Biology :	
Professor	3,200 00
Lecturer in Zoology and Assistant Curator Museum	1,300 00
Lecturer in Biology and Histology	1,000 00
Lecture and Laboratory Assistant (sessional	250 00
Class Assistants (11 at $50) (sessional)	300 00
Sub-Curator Museum	750 00
Attendant and caretaker	500 00
Laboratory Attendant	135 00
	7,435 00
Sub-Department of Botany :	
Lecturer (3 months)	450 00
Lecturer (9 months in 1902-3)	750 00
Instructor (sessional)	500 00
	9,135 00
(*e*) Physiology :	
Professor	2,500 00
Demonstrator (sessional)	1,000 00
	3,500 00
(*f*) Italian and Spanish :	
Professor	2,500 00
Instructor in Spanish	200 00
Instructor in Italian (sessional)	400 00
	3,100 00

(*g*) Philosophy :	
Professor	2,000 00
Lecturer	1,575 00
Lecturer and Laboratory Assistant	1,000 00
Laboratory Assistant (sessional)	200 00
	4,775 00
6. Teaching Staff, University College :	
(*a*) Ethics, Professor	3,200 00
(*b*) Greek :	
Professor	3,200 00
Lecturer	1,800 00
	5,000 00
(*c*) Latin :	
Professor	3,175 00
Lecturer and Associate Professor Ancient History	1,800 00
Lecturer	1,575 00
	6,550 00
(*d*) Oriental Literature :	
Professor	3,200 00
Lecturer	1,575 00
	4,775 00
(*e*) English :	
Professor	3,200 00
Associate Professor Anglo-Saxon	1,800 00
	5,000 00
(*f*) French :	
Professor	2,500 00
Associate Professor	1,800 00
Instructor	1,000 00
	5,300 00
(*g*) German :	
Professor	2,500 00
Lecturer	1,800 00
Instructor	1,000 00
	5,300 00
7. University College, general :	
Principal	300 00
8. Gymnasium :	
Secretary	200 00
Instructor	800 00
Caretaker	576 00
	1,576 00
Expenses.	
2. Bursar's Office :	
Stationery, postage, printing and incidentals	442 62
Auditor	300 00
	742 62
3. Registrar's Office :	
Stationery and office supplies	391 38
Postage	530 00
Printing, other than Calendar	154 06
Printing Calendar and Curricula	1,681 00
	2,756 44
4. Vice-Chancellor's Office :	
Honorarium	400 00
Expense indemnity	270 00
	670 00

5. President's Office :		
Secretarial allowance		200 00
Postage and incidentals		82 73
Travelling expenses		164 00
		446 73
6. Law costs		1,973 43
7. General incidentals, including commissions on real estate transactions		1,500 00
8. Insurance		2,388 60
9. Telephones		297 50
10. Convocation expenses		899 25
11. Examinations :		
(a) Remuneration to examiners :		
Arts		763 10
Medicine		1,473 00
Law		40 00
Engineering and Applied Science		192 00
Dentistry		555 00
Agriculture		263 40
Music		605 50
Pharmacy		420 35
Pedagogy		40 00
Matriculation		85 00
Household Science		20 00
Physical Drill		12 00
		4,469 35
(b) Stationery and supplies		707 09
(c) Cost of printing examination papers and class lists		1,793 20
		6,969 64
Less Government share for departments of Chemistry and Physics		325 00
		6,644 64
12. Library :		
(a) Maintenance : Fuel		432 27
Water		21 16
Cleaning		175 00
Repairs and incidentals		81 60
		710 03
(d) Customary grant for books		2,600 00
		3,310 03
13. Grounds :		
Labour, tools, gravel, culverts, etc		2,993 24
		2,993 24
14. Main Building :		
Extraordinary expenditure, including repainting building and restoration of tower		1,597 35
Repairs (including carpentry and plumbing), and sundries		2,197 97
Fuel		2,362 86
Water		401 48
Gas and Electric Light		581 50
		7,141 16
Less Government share for Department of Physics		2,000 00
		5,141 16
15. Biological Building :		
(a) Maintenance of Structure :		
Fuel		877 56
Gas and electric light		221 17
Water		112 91
House furnishings and cleaning materials		226 79
Repairs, including carpentry and plumbing		324 17
Additional attendance and cleaning assistance		293 15
		2,055 75
Less Government share for Department of Mineralogy and Geology		100 00
		1,955 75

(b) Biological Department :

Laboratory and Lecture Room supplies	299 92
Museum supplies	34 12
Marine and Lake laboratories	200 00
Students' laboratory supplies	784 00
Assistance in preparation of catalogue	250 00
New microscopes and projection apparatus	250 00
	2,133 04

16. Physiological Department :

Maintenance	600 00
Students' laboratory supplies	212 00
	812 00

17. Psychological Department :

Maintenance	299 96

18. Mathematics 52 49

19. Political Science :

Class room supplies	60 01

20. History :

Class room supplies and provision for reading essays	149 28

21. Italian and Spanish :

Class room supplies	20 00

22. Advertising	525 65
23. Incidentals	191 02

24. University College Departments :

Classics :

Greek class room supplies	128 90
Latin class room supplies	5 00

English :

Class room supplies and provision for reading essays	100 00

French :

Class room supplies	26 65

German :

Class room supplies	6 65

Oriental Literature :

Class room supplies	25 00
Stationery	44 32
Printing	40 69
Advertising	46 22
Incidentals	134 90

25. Gymnasium and Students' Union :

Fuel	350 57
Water	125 14
Gas	67 74
Cleaning	81 91
Repairs and incidentals	153 89
Apparatus, labor, etc.	137 50
	916 75

26. University Press :

Portion of cost of presses and type	500 00
Additions to type and equipment	432 97
Incidental expenses	188 08
	1,121 05

27. Vaccination expenses :

Physicians' charges	445 00
Vaccine, etc.	139 55
	584 55

28. Educational Association Reception	249 92
29. Conversazione, grant towards	150 00
30. Renovation Y. M. C. A. Building	159 00

DEPARTMENTS MAINTAINED BY GOVERNMENT.

Summary.

1. Chemistry :	
Salaries	9,175 75
Maintenance	3,906 85
2. Physics :	
Salaries	10,740 00
Maintenance	4,494 63
3. Mineralogy and Geology :	
Salaries	4,825 00
Maintenance	2,677 67
4. Examination Expenses :	
Share of Chemistry and Physics	325 00
	36,144 90

Details.

1. Chemistry :

(*a*) Salaries :

Professor	2,700 00
Associate Professor	2,000 00
Lecturer	1,175 00
Lecturer	1,175 00
Assistant (sessional)	500 00
Assistant (sessional)	500 00
Two Junior Assistants (sessional)	468 75
Attendant	504 00
Cleaner	153 00
	9,175 75

(*b*) Maintenance of building :

Fuel	578 73
Gas and electric light	278 87
Water	126 46
Cleaning	100 00
Repairs and incidentals	346 67
Fitting up physical chemical laboratory	254 56
Storage cells and blinds	504 50
Fitting up room as laboratory	310 04
	2,499 83

(*c*) Maintenance of department :

Chemicals, glassware, balances, etc	1,112 64
Appropriation for sub-department of physical chemistry	294 38
	1,407 02

2. Physics :

(*a*) Salaries :

Professor	3,200 00
Associate Professor	1,800 00
Associate Professor	1,800 00
Lecturer	1,800 00
Lecture assistaont	390 00
Laboratory assistant (sessional)	750 00
Mechanical assistant	1,000 00
	10,740 00

(*b*) Maintenance of department :

Supplies, apparatus, etc	2,494 63
Proportions of fuel, water, light, cleaning repairs and incidentals, Main Building account	2,000 00
	4,494 63

3. Mineralogy and Geology :

(*a*) Salaries :

Professor Geology	600 00
Professor Mineralogy	2,575 00
Lecturer (including arrears in 1902-3)	1,350 00
Attendant	300 00
	4,825 00

(b) Maintenance of department :

Mineralogy :

Apparatus		1,200 80
Maintenance		398 51
Proportions of fuel, water, light, cleaning, repairs and incidentals, Biological Building account		100 00
		1,699 31

Geology :

Apparatus		612 73
Supplies and sundries		365 63
		978 36

4. Departments of Chemistry and Physics :

Share of examination expenses		325 00
		325 00

II. Faculty of Medicine.

Income.

first year	9,108 00	
Less Arts portion	1,260 00	
		7,848 00
Second year	11,186 00	
Less Arts portion	1,650 00	
		9,536 00
Third year		11,173 00
Fourth year		9,664 00
Miscellaneous fees		955 00
Registration fees		540 00
Psychological fees (collected for Dr. Daniel Clark)		465 00
Interest on bank account		433 49
		$40,614 49

Expenditure.

Salaries (details below)		26,223 15
Rents of		
Biological building	$1,900 00	
Gerrard Street building	1,000 00	
		2,900 00
Interest on University advance *re* Pathological Department	96 00	
Repayment of part of advance (balance due $800	1,600 00	
		1,696 00
Interest on cost of new building and fittings		1,903 05
Working expenses		7,892 29
		$40,614 49

Professors.

Dr. A. Primrose	Anatomy	$1,500 00	
Dr. J. J. McKenzie	Pathology	1,500 00	
Mr. I. H. Cameron	Surgery and Clinical Surgery	1,140 00	
Dr. A. McPhedran	Medicine and Clinical Medicine	1,140 00	
Dr. W. Oldright	Hygiene	1,140 00	
Dr. A. H. Wright	Obstetrics	1,140 00	
Dr. U. Ogden	Gynaecology	760 00	
Dr. J. M. MacCallum	Pharmacology and Therapeutics	760 00	
Dr. R. A. Reeve	Ophthalmology, etc	456 00	
Dr. G. R. McDonagh	Laryngology	456 00	
Dr. W. H. Ellis	Toxicology	380 00	
			$10,372 00

Associate Professors.

Dr. G. A. Peters	Surgery and Clinical Surgery	$1,140 00	
Dr. G. H. Burnham	Ophthalmology	304 00	
Dr. W. H. Aikins	Anatomy	760 00	
Dr. W. P. Caven	Clinical Medicine	760 00	
Dr. H. A. Bruce	Clinical Surgery	608 00	
Dr. J. F. W. Ross	Gynaecology	608 00	
Dr. Heebner	Pharmacology	486 40	
Dr. F. N. G. Starr	Clinical Surgery, etc	456 00	
Dr. W. B. Thistle	Clinical Medicine, etc	456 00	
Dr. J. A. Amyot	Pathology, etc	456 00	
Dr. H. T. Machell	Obstetrics	319 20	
			6,353 60

Lecturers and Instructors.

Dr. R. D. Rudolf	Medicine and Clinical Medicine	$380 00	
Dr. R. J. Dwyer	Medicine and Clinical Medicine	380 00	
Dr. G. Boyd	Clinical Medicine	304 00	
Dr. A. R. Gordon	Clinical Medicine	304 00	
Dr. G. Chambers	Clinical Medicine	304 00	
Dr. C. L. Starr	Clinical Surgery	304 00	
Dr. W. McKeown	Clinical Surgery	304 00	
Dr. G. Silverthorn	Medical Jurisprudence	175 00	
			2,455 00

Demonstrators and Assistant Demonstrators.

Dr. F. N. G. Starr	Anatomy	$150 00	
Dr. W. J. McCollum	Anatomy	150 00	
Dr. W. J. O. Malloch	Anatomy	150 00	
Dr. S. H. Westman	Anatomy	150 00	
Dr. E. R. Hooper	Anatomy	150 00	
Dr. W. J. Wilson	Anatomy	150 00	
Dr. C. L. Starr	Anatomy	150 00	
Dr. A. C. Hendrick	Anatomy	100 00	
Dr. A. J. Mackenzie	Anatomy	100 00	
Dr. D. McGillivray	Anatomy	100 00	
Dr. W. Goldie	Clinical Medicine	175 00	
Dr. G. Silverthorn	Pathology, etc	150 00	
Dr. C. J. Wagner	Pathology, etc	150 00	
Dr. T. D. Archibald	Pathology, etc	250 00	
Dr. M. M. Crawford	Pathology, etc	100 00	
Dr. F. A. Clarkson	Pathology, etc	50 00	
Dr. K. C. McIlwraith	Obstetrics	175 00	
Dr. C. H. Montgomery	Assistant Clinical Laboratory	250 00	
			2,650 00

FACULTY OF MEDICINE.

General Service.

Dr. Primrose	Secretary to the Faculty	$1,200 00	
Dr. J. J. MacKenzie	Assistant Secretary	100 00	
Dr. J. J. MacKenzie	Curator of Museum	500 00	
Thos. Motton	Janitor and Caretaker at Medical School Building	720 00	
George Lynn	Attendant and Caretaker at Anatomical Department	660 00	
John Anderson	Additional attendant	344 70	
G. Dunkin	Temporary attendant	31 50	
H. Crombie	Boy messenger and attendant	121 35	
			3,677 55

Miscellaneous.

Dr. Daniel Clark	Psychology fees collected for him	465 00	
Dr. J. H. Richardson	Honorarium as retired Professor	250 00	
			715 00
Total			$26,223 15

III. FACULTY OF APPLIED SCIENCE AND ENGINEERING.

(School of Practical Science.)

EXPENDITURE

Summary.

Salaries (details below)	$28,202 66
Expenses	5,427 65
Maintenance and repairs	6,163 46
Instruction by Arts Faculty	1,715 00
Examiners	1,266 20
	$42,774 97
Receipts from fees	24,053 00
Showing a difference of	$18,721 97

Being the excess of expenditure over receipts supplied from vote of Legislature.

DETAILS OF SALARIES.

Principal and Professors.

J. Galbraith	Principal and Professor of Engineering	$3,200 00
W. H. Ellis	Professor of Applied Chemistry	1,600 00
A. P. Coleman	Professor of Metallurgy and Assaying	2,000 00
L. B. Stewart	Professor of Surveying	1,900 00
C. H. C. Wright	Professor of Architecture	1,900 00
T. R. Rosebrugh	Professor of Electrical Engineering	1,900 00

Lecturers and Registrar.

J. McGowan	Lecturer in Applied Mechanics	$1,200 00
G. R. Mickle	Lecturer in Mining	1,300 00
R. W. Angus	Lecturer in Mechanical Engineering	1,300 00
A. T. Laing	Registrar	1,200 00
J. W. Bain	Lecturer in Applied Chemistrp	1,200 00

Demonstrators.

H. G. McVean	Demonstrator in Mechanical Engineering	$800 00
H. W. Price	Demonstrator in Electrical Engineering	800 00

Fellows and Assistants.

W. C. Tennant	Fellow in Civil Engineering (9 mos.)	$375 00
A. E. Davison	Fellow in Civil Engineering (3 mos.)	125 00
J. G. McMillan	Fellow in Mining	500 00
C. G. Williams	Fellow in Chemistry (3 mos.)	125 00
E. G. R. Ardagh	Fellow in Chemistry	500 00
M. V. Sauer	Fellow in Electricity (9 mos.)	375 00
H. M. Shipe	Fellow in Electricity (3 mos.)	125 00
W. E. Wagner	Fellow in Mechanical Engineering (7 mos.)	291 00
J. A. Craig	Fellow in Mechanical Engineering (2 mos.)	84 00
S. B. Wass	Fellow in Mechanical Engineering (3 mos.)	125 00
E. V. Neelands	Fellow in Surveying (9 mos.)	375 00
J. L. R. Parsons	Fellow in Surveying (3 mos.)	125 00
A. H. McBride	Fellow in Drawing (9 mos.)	375 00
J. R. Cockburn	Fellow in Drawing (3 mos.)	125 00
M. C. Boswell	Lecture Assistant (9 mos.)	375 00
E. G. Marriott	Lecture Assistant (3 mos.)	125 00

Attendants.

[illegible] Sinclair	Attendant in Chemistry	$600 00
G. Lamb	Attendant in Metallurgy	350 00
E. Tozer	Attendant in Mining	240 00
[illegible] K. Armbrust	Attendant in Drawing (2 mos.)	63 00
W. J. Graham	Caretaker	750 00
M. D. King	Stenographer (9 mos.)	227 66
A. J. Rickard	Stenographer (1 mo.)	27 00
[illegible] Enright	Messenger (8 mos.)	120 00
W. Simpson	Engineer and Assistant Demonstrator	900 00
[illegible] F. MacKay	Fireman (8 mos.)	320 00
W. Scott	Night Fireman (4 mos.)	180 00
		$28,202 66

ADDENDUM M.—LIST OF PAPERS AND WORKS BY MEMBERS OF FACULTIES AND RESEARCH STUDENTS FOR THE YEAR 1902-1903.

Alexander, W. J.:

"As You Like It and Dramatic Unity." Proceedings of Ontario Educational Association, 1903.)

"Sartor Resartus." (University of Toronto Monthly, Vol. III., Nos. 6 and 7.)

"Elementary Composition." (In Gloggin's Elementary Grammar, W. J. Gage, & Co., Toronto).

"Select Poems of Tennyson, with Introductory Notes." (Copp, Clark Co., Limited, Toronto).

Allan, F. B.:

"The Basic Oxalates of Bismuth." (Journal of the American Chemical Society, XXV.)

"A New Double Oxalate of Bismuth and Ammonium" (in collaboration with T. A. Phillips). (Journal of the American Chemical Society, XXV.)

"A New Double Oxalate of Bismuth and Potassium" (in collaboration with J. S. DeLury). (Journal of the American Chemical Society XXV.)

Amyot, J. A.:
"Report on Sewage Disposal, based on six months experimental work done at Berlin, Ontario." (21st Annual Report of Provincial Board of Health, Ont.)
Baker, Alfred:
"Elementary Plane Geometry—Inductive and Deductive." (W. J. Gage & Co., Toronto.)
Bensley, B.A.:
"On the Identification of Meckelian and Mylohyoid Grooves in the Jaws of Mesozoic and Recent Mammalia." (University of Toronto Studies, Biological Series, No. 3, 1902.)
Benson, Miss C.C.:
"The Rate of Oxidation of Ferrous Salts by Chromic Acid." (Jour. Phys. Chem., Jan., 1903.)
"The Rates of the Reactions in Solutions containing Ferrous Sulphate, Potassium Iodide and Chromic Acid." (Jour. Phys. Chem., May, 1903.)
Burwash, N.:
"The Evolution and Degeneration of Party in Politics." (Trans. of the Royal Society of Canada.)
"John Wesley as an Educator."
Cameron, J. Home:
"Elements of French Prose." (Edward Arnold, London, April, 1903.)
"Emile Zola." (University of Toronto Monthly, Jan., 1903.)
Chant, C. A.:
"The Variations of Potential along a Wire transmitting Electric Waves." (American Journal of Science, Jan., 1903; Philosophical Magazine, March, 1903.)
"The Physical Basis of Color." (Science, May, 1903.)
Coleman, A. P.:
"Nephelem and Other Syenites in Ontario." (Amer. Jour. Sc., Vol. XIV., August.)
"The Michipicoten Iron Ranges." (Coleman and Willmott). (University of Toronto Studies, No. 2, Geol. Series.)
"The Classification of the Archaean." (Trans. Royal Society, Canada, Vol. VIII., Sec. IV.)
"The Brazean Ice Field." (Jour. Roy. Geogr. Soc., May, 1903.)
"Report on Sudbury Nickel Deposits." (Bureau of Mines, 1903.)
Davidson, F. J. A.:
"The Plays of Paul Hervieu." (Proceedings of the Modern Language Association of Ontario, 1902.)
"Le Village," par Octave Feuillet. Edited, with Introduction, Notes, Exercises and Glossary. (The Copp, Clark Co., Toronto, 1902; New York, Henry Holt & Co., 1903.)
"La Belle Nivernaise," par Alphonse Daudet. (The Copp, Clark Co., 1903.)
De Lury, A. T.:
"An Arithmetic for High Schools and Collegiate Institutes." (The Canada Publishing Co., Toronto, 1903.)
Faull, J. H.:
"Noxious Weed-Seeds commonly found in Commercial Grass-Seeds." (In collaboration with Mr. G. H. Clark, Department of Agriculture, Ottawa.)
Fields, J. C.:
"The German University and German University Mathematics." (Proceedings of Ontario Educational Association, 1903.)
"The Abel Centenary." (University of Toronto Monthly, April, 1903.)

Kenrick, F. B.:

"The Application of Polarimentry to the Estimation of Tartaric Acid in Commercial Products." (In collaboration with Edgar B. Kenrick,) (Jour. American Chem. Soc., Oct., 1902); also a Preliminary note on the same subject (in U.S. Dept. of Agriculture, Bureau of Chemistry, Bulletin No. 65.)

Keys, D. R.:

"The Scottish Dialect of English." (Fraser's Scottish Annual, 1902.)
"Queen Margaret of Scotland." (Fraser's Scottish Annual, 1903.)
"Was Shakespeare bred an Attorney?" (Canadian Law Review, Vol. 2.)
"French Law, and Law French." (Canadian Law Review, Vol. 2.)

Kirschmann, A.:

"Die Dimensionen des Raumes, eine kritische Studie." (Wilhelm Enzelmann, Leipzig.) (Philosophical Studies, Jubilee Volume, in honor of Prof. Wundt's seventieth birthday.)

"Zur Rechtfertigung der Deutchen Schrift." Two articles. (Scientific Supplement to Munich Gazette.)

Lang, W. R.:

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"The Review of the Historical Publications Relating to Canada," Vol. VII. (University of Toronto Studies, 1902.)

Annual

Archæological Report

1903

BEING PART OF

Appendix to the
Report of The Minister of Education
Ontario

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1904

TORONTO:
WARWICK BRO'S & RUTTER, LIMITED, PRINTERS.

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PRESENTATION.

Hon. Richard Harcourt, LL.D., K.C.,
Minister of Education.

Sir,—In presenting to you the accompanying report on the archæology of the Province, it is pleasing to be able to state that the year has been quite a satisfactory one in so far as the museum is concerned.

Office work demands most of the curator's time, partly on account of correspondence, partly because the large number of specimens (now nearly 27,000) on exhibition, require a corresponding amount of care; but to a very great extent also for the reason that his appointment as Superintendent of the Provincial Museum, as a whole, makes it necessary to devote a good deal of attention to general oversight.

It is hoped that during 1904 something may be accomplished in the way of field work, in response to requests that have reached the museum from so many quarters.

The increase in the quantity of material demands more case-room, and the curator's duties cannot be accomplished in anything like a proper way without better office and workshop accommodation.

I have the honor to be,

Yours respectfully,

DAVID BOYLE.

Education Department of Ontario,
Toronto, December 23rd, 1903.

25,001 Wooden extension candlestick. Candlesticks of this kind were used by shoemakers and wagonmakers over fifty years ago. W. J. Wintemberg.

25,002-004 Iron lamps used in Oxford and Waterloo counties, in the early part of last century, W. J. Wintemberg.

25,005 Sheet metal lamp used by one of the gold workers, in the African village at the Pan-American Exposition, Buffalo, U.S.A. W. J. Wintemberg.

25,006-20 from Dr. R. W. Large.

25,006 Wooden spoon or ladle. Tay township, Simcoe co.

25,007-11 Bone and horn awls. Tay township, Simcoe co.

25,012 Fragment of a small clay vessel. Tay township, Simcoe co.

25,013 Stem of a soadstone pipe. Tay townshop, Simcoe co.

25,014 Worked bone. Tay township, Simcoe co.

25,015 Part of a bone harpoon point. Tay township, Simcoe co.

25,016-17 Bone awls. Tiny township, Simcoe co.

25,018 Brass ring. Tiny township, Simcoe co.

25,019 Iron arrowhead. Tiny township, Simcoe co.

25,020 Iron pipe. Tiny township, Simcoe co.

25,021-3 Old flint lock; double barbed muskrat spear of iron, seventeen inches long (for using through the ice); and a rapier blade, two feet long exclusive of the handle portion. Found on the banks of the Talbot river, at Bolsover, per G. E. Laidlaw, from Jas. McGirr.

25,024 Wooden beater, used in the manufacture of tapa cloth from the inner bark of the mulberry, South Sea Island. David Boyle.

25,025 Ngae Yen. Two-stringed musical instrument, Canton, China. (Purchase.)

25,026-44 presented by Howard R. Kelcy.

25,026-29 Pottery fragments, lot 7, con. 10, Innisfil tp.

25,030-32 Fragments of pipes, lot 7, con. 10, Innisfil tp.

25,033-36 Bone awls, lot 7, con. 10, Innisfil tp.

25,037-38 Bone beads, lot 7, con. 10, Innisfil tp.

25,039 Shell of unio, lot 7, con. 10, Innisfil tp.

25,040-43 Rubbing stones, lot 7, con. 10, Innisfil tp.

25,044 Broken celt, lot 7, con. 10, Innisfil tp.

25,045-51 presented by F. W. Waugh.

25,045 Bone needles, Brant co.

25,046 Bone specimen, Brant co.

25,047 Portion of the carapace of Chrysemys picta, Indian village site, Brantford tp., Brant co.

25,048-51 Various animal bones, Indian village site, Brantford tp., Brant co.

25,052 Bone apple-scoop used in Yorkshire, England, many years ago. T. Ware, per W. J. Wintemberg.
25,053 Bone harpoon. W. J. Wintemberg.

25,054 Very fine banner stone, North Easthope tp., Perth co. Mr. W. J. Fraser, Toronto.
25,055 Bone in preparation for making fish hooks; from a mound. W. C. Mills, Curator of the Ohio Archæological and Historical Society's Museum, Columbus, Ohio.
25,056 Piece of human frontal bone from an earthwork, Malahide tp. R. T. Anderson, Aylmer, Ont.
25,057 Gorget (subsequently used for whetting or smoothing), lot 8, con. 10, Blenheim tp. G. Campbell, per W. J. Wittemberg.
25,058 Huronian slate object, Blanchard tp. Jno. McEwen, per W. Matheson.

From 25,059-438 from J. P. Hunt.

25,059 Grooved axe, T. Forbner, Delaware tp.
25,060 Grooved axe, West London, Ont. Mr. Lawrence.
25,061 Grooved axe, lot 21, con. 7, E. Nissouri tp. D. Wilkie.
25,062 Grooved axe, lot 6, con. 9, Enniskillen tp. W. A. Brock.
25,063 Grooved axe, Grovesend, Elgin co., Ont. C. A. Stalter.
25,064 Grooved axe, Michigan. J. B. Watson.
25,065 Grooved axe, procured from Indians about 1840, by Mr. Holman, of London, Ont.
25,066 Gorget, lot 8, con. 3, London tp. Miss Webster.
25,067-70 Gorgets. On banks of Otter Creek near Tillsonburg. C. Wilcox.
25,071 Gorget, lot 31, con. 1, Westminster tp. J. Dale.
25,072 Gorget, con. 11, East Nissouri tp. J. Bolton.
25,073 Gorget, con. 9, East Nissouri tp. R. Adams.
25,074 Gorget, con. 7, East Nissouri tp. J. Newman.
25,075 Gorget, con. 9, East Nissouri tp. Jas. Speck.
25,076 Gorget, con. 9, East Nissouri tp. R. Adams.
25,077 Gorget, Grovesend, Elgin co., per M. Griffin.
25,078 Gorget, lot 25, con. 2, London tp. H. Prince.
25,079 Unfinished gorget, Grovesend, Elgin co. A. Marr.
25,080 Unfinished gorget, Thomas farm, Lambeth, Ont.
25,081 Unfinished gorget, lot 31, con. 7, E. Nissouri tp. F. Hunt.
25,082 Gorget, Blanchard tp. Mr. Pickard.
25,083 Catlinite pipe, Dakota, U.S.A. J. Brown.
25,084 Clay pipe bowl, Nixon farm, Pond Mills, Westminster tp.
25,085 Stone pipe head, North West Territories. Mr. McIntosh.
25,086 Stone pipe bowl, ploughed up on bank of creek near St. Mary's, Blanchard tp. Mrs. Constable.
25,087 Fragment of ornamented pipe-stem, Westminster, Ont. Mr. Dale.
25,088-90 Clay pipes, McArthur farm, Westminster tp. Middlesex county.

25,093 Unfinished limestone pipe, Middlesex county.
25,094-5 Clay pipe bowl, McNeady farm, Orwell, Elgin county.
25,096 Stone pipe bowl, given to British officer stationed at London, Can., in 1856, by an Indian. Mr. Screaton.
25,097 Catlinite pipe head, N. W. Territory. E. Wilson, Tillsonburg.
25,098 Bird effigy pipe, ploughed up at Lion's Head, Georgian Bay. Mr. Roberts.
25,099 Clay pipe bowl, Thomas farm, Lambeth, Middlesex county, Ont.
25,100 Clay pipe bowl, Edwards' farm, Komoka, Middlesex county.
25,101 Fragment of a decorated pipe bowl, Middlesex county.
25,102 Chisel, Aylmer, Elgin county.
25,103 Chisel, Mount Brydges, Ont. R. Arnold.
25,104 Syenite adze, Grovesend, Elgin county. Mr. Griffin.
25,105 Gouge. Thomas farm, Lambeth, Middlesex county, Ont.
25,106 Hematite celt, Colorado. Mr. Atwater.
25,107 Large heavy adze, Langford farm, London tp., Middlesex county.
25,108 Limestone celt, in process of manufacture. Langford farm, London tp.
25,109 Unfinished celt, Delaware, Westminster tp. R. Gibson.
25,110 Celt, Delaware, Westminster tp. R. Gibson.
25,111 Celt, made from waterworn pebble, Gravesend, Elgin county. W. Smith.
25,112 Celt, in process of manufacture, Grovesend, Elgin county, A. Marr.
25,113 Celt, Middlesex county.
25,114-5 Hammer stones, E. Nissouri tp. J. Hogarth.
25,116 Hammer stone, London tp. J. Corsant.
25,117-18 Hammer stone, Barter farm, London tp., Middlesex county.
25,119 Hammer stone, Thomas' farm, Lambeth, Ont.
25,120 Half of a pick-like banner stone, Ontario county. W. Davis.
25,121 Huronian slate banner stone, Westminster tp. Mr. Dale.
25,122 Broken "butterfly" banner stone, Walker farm, E. Nissouri.
25,123 Banner stone, Grovesend, Elgin county. R. Chute.
25,124 "Butterfly" banner stone, Kettle Point, Ont. Dr. McArthur.
25,126 Perforated disc, Grovesend, Elgin. Jas. Chute.
25,128 Bird amulet, London. Mr. J. Tune, London (city.)
25,129 Bird amulet, London, con. 5, Westminster tp. Jas. Anderson.
25,130 Bird amulet, Scanlon farm, East London. Mr. Scanlon.
25,131 Perforated ball-like ceremonial stone, Gallagher farm, 9th con. E. Nissouri tp.
25,132 Stone tube, near Hyde Park, London tp. Mr. Mackleborough.
25,133 Stone tube, London, Ont. Mr. J. Tune.

25,134 Copper bead, dug up on farm of Mr. Pascoe by H. Pascoe, Ontario county.
25,135 Copper chisel, found by Captain Barr on his farm, Pt. Bruce, Elgin county.
25,136 Copper spear, sharp at both ends, taken from a mound near Norwich, by Warren Haley.
25,137 Curved copper knife, taken from near Norwich, Oxford county. W. Haley.
25,138 Copper chisel, London. J. Tune.
25,139 Long stone pestle, Pt. Burwell. Wm. Weaver.
25,140 Unfinished stone tube or pipe, Little York. Mr. Cook.
25,141 Grooved maul or pestle, Kettle Point. Dr. McArthur.
25,142 Stone spade or hoe, near Otter Creek, Tillsonburg. C. Wilcox.
25,143 Argillite spear head, near Otter Creek, Tillsonburg. C. Wilcox.
25,144-5 Large unnotched spear head, Grovesend, Elgin county. J. Marr.
25,146-7 Chert drills, Hyde Park, London tp. Mr. Mackleborough.
25,148 Gouge, Middlesex county.
25,149 Small slate pendant, Middlesex county.
25,150 Rubbing stone, Middlesex county.
25,151 Worked stone, Middlesex county.
25,152 Half of ceremonial stone, Middlesex county.
25,153 Huronian slate disc, Middlesex county.
25,154 Unfinished stone pipe, Middlesex county. This specimen came without any data as to locality. It is of Huronian slate, and may not have been intended for a pipe.
25,155 Long bone awl, found with a copper head (25,134), in a mound in Ontario county. H. Pascoe.
25,156-206 Bone awls from various places in Western Ontario, Hyde Park, London tp.
25,207-10 Horn pins, Middlesex county.
25,211 Antler worked, Middlesex county, London tp.
25,212 Canine tooth of bear, Middlesex county.
25,213 Horn arrow tip, Middlesex county.
25,214 Horn implement, Middlesex county.
25,215 Bone head, Middlesex county.
25,216 Bone implement, Mackleborough farm, Hyde Park, London tp. W. Wade.
25,217 Bone or horn implement, Middlesex county.
25,218 Shell of *unio undulatus* with umbo ground down until a hole appeared. Middlesex county.
25,219 Adze, Bogue farm, Westminster tp., Middlesex county.
25,220 Adze, lot 32, con. 7, East Nissouri tp. J. Wakem.
25,221 Adze, Westminster tp. J. Anderson.
25,222 Large leaf shaped chert implement. Locality not known.
25,223-26 Leaf shaped chert implements, Middlesex county.
25,227-45 Leaf shaped chert knives, Middlesex county.
25,246-51 Spear heads, Middlesex county.
25,252-56 Arrowheads, shouldered but not barbed, Middlesex county.

25,257-59 Rotary (?) arrowheads, Middlesex county.
25,260 Celt or adze, Grovesend, Elgin county.
25,261 Celt or adze, Lambeth tp.
25,262 Celt or adze, Bogue farm, Westminster tp.
25,263 Celt or adze, Komoka, Ont.
25,264 Celt or adze, Little York, Ont., just east of Toronto.
25,265 Celt or adze, Little York, Ont., just east of Toronto.
25,266 Celt or adze, Delaware, Westminster tp.
25,267 Celt or adze, Grovesend, Elgin county.
25,268 Celt or adze, Manitoulin Island. Mr. Rumball.
25,269 Celt or adze, Grovesend, Elgin county.
25,270 Celt or adze, Grovesend, Elgin county.
25,271 Celt or adze, near Asylum for Insane, London, Ont.
25,272 Celt or adze, Delaware, Westminster tp.
25,273 Celt or adze, near Asylum for Insane, London, Ont.
25,274 Celt or adze, Grovesend, Elgin county.
25,275 Celt or adze, Glanworth, Westminster tp.
25,276 Celt or adze, Grovesend, Elgin county. C. Stalter.
25,277 Celt or adze, collected by Smithsonian Institute, Washington, D.C.
25,278 Celt or adze, lot 32, con. 7, E. Nissouri tp., (Atwater). J Wakem.
25,279 Celt or adze, Grovesend, Elgin county. Mr. Piggot.
25,280 Celt or adze, Grovesend, Elgin county. Mr. Tedford.
25,281 Celt or adze, Thomas farm, Westminster tp.
25,282 Celt or adze, White Oak. Frank Shore.
25,283 Celt or adze, Mt. Bridges. R. Arnold.
25,284 Celt or adze, Westminster tp. Mr. Horton.
25,285 Celt or adze, Grovesend, Elgin county. W. Smith.
25,286 Celt or adze, Thomas farm, Lambeth tp.
25,287 Celt or adze, Delaware, Westminster tp. R. Gibson.
25,288 Celt or adze, Glencoe, Ont. Dr. Weeks.
25,289 Celt or adze, Grovesend, Elgin county. Mr. Tedford.
25,290 Celt or adze, Thomas farm, Lambeth tp.
25,291 Celt or adze, Grovesend, Elgin county.
25,292 Celt or adze, Middlesex county.
25,293 Celt or adze, E. Nissouri tp. F. McMaster.
25,294 Celt or adze, Manitoulin Island. Mr. Rumball.
25,295 Celt or adze, Grovesend, Elgin county. Jas. Chute.
25,296 Celt or adze, Glanworth, Westminster tp. J. Jones.
25,297 Celt or adze, Middlesex county.
25,298 Celt or adze, Tillsonburg, Ont.
25,299 Celt or adze, Otter Creek. C. W. Wilcox.
25,300 Celt or adze, Westminster tp. J. Anderson.
25,301 Celt or adze, Grovesend, Elgin county. Mr. Farra.
25,302 Celt or adze, Thomas farm, Lambeth tp.
25,303 Celt or adze, Thomas farm, Westminster tp.
25,304 Celt or adze, Bogue farm, Westminster tp.
25,306 Celt or adze, Grovesend, Elgin county. C. Stalter.
25,307 Celt or adze, Grovesend, Elgin county. Mr. Wagan.
25,308 Celt or adze, lot 32, con. 7, E. Nissouri tp. W. Greason.
25,309-13 Celt or adze, Middlesex county.

25,314 Chisel, Glendale, Westminster tp. Mr. Dale.
25,315 Chisel, Grovesend, Elgin county. Jos. Marr.
25,316 Chisel, London tp., per Mr. Mackleborough.
25,317 Celt, Middlesex county.
25,318-22 Sinkers, Smith farm, Grovesend, Elgin county.
25,323-25 Sinkers, James Chute farm, near Pt. Burwell.
25,325-28 Sinkers, Tedford farm, Grovesend, Elgin county.
25,329-36 Sinkers, Middlesex county.
25,337-38 Fragments of gorgets. Thomas farm, Lambeth tp.
25,339 Fragment of gorget. Whetler farm, near London, Ont.
25,340 Fragment of gorget, near Tillsonburg, Ont. C. Wilcox.
25,341-42 Fragments of gorgets, Tillsonburg, Ont. E. Wilson.
25,343 Fragment of banner stone, Aylmer, Ont. C. Stalter.
25,344 Fragment of banner stone, Glencoe, Ont. Dr. Weeks.
25,345 Fragment of bar-amulet, Middlesex county, Ont.
25,346-54 Fragments of pipes, Thomas farm, Lambeth tp.
25,355 Fragment of pipe bowl, Grovesend, Elgin county, Ont. J. Telford.
25,356 Fragment of pipe bowl, McReady farm, Orwell, Yarmouth tp.
25,357 Pipe stem, Nixon farm, Pond Mills, Ont.
25,358 Pipe stem, McArthur farm, Westminster tp.
25,359 Pipe fragment, McArthur farm, Westminster tp.
25,360 Pipe fragment, McArthur farm, Westminster tp.
25,361-62 Fragments of pipe bowls, McArthur farm, Westminster tp.
25,362-64 Fragments of pipe bowls, McReady farm, Orwell, Yarmouth tp.
25,365-66 Fragments of pipe bowls, lot 14, Westminster tp. T. Burgers.
25,367-68 Fragments of pipe bowls, near creek, Pottersburg.
25,369-71 Fragments of pipe bowls and stem, Middlesex county.
25,372 Fragment of limestone pipe, Scanlon farm, London tp.
25,373-76 Bone and deer horn awls and pincers, Middlesex county.
25,377-83 Worked unio shells, Middlesex county.
25,384-85 Worked pieces of slate, Middlesex county.
25,386 Huronian slate tube, Glencoe, Ont. Dr. Weeks.
25,387 Part of limestone pipe bowl, bearing rude pictographs, Mr Shaw Wood's farm at the Old Fort.
25,388-91 Peculiar forms of chert scrapers, Middlesex county.
25,392-415 Arrowheads of various types and materials, Middlesex county.
25,422 Chert knife, Middlesex county.
25,423 Chipped chert object retaining original outer surface of waterworn pebble on lower edge, Middlesex county.
25,424 Peculiarly shaped chert implement, may have been an arrow shaft scraper, Middlesex county.
25,425 Arrowhead, broad leaf-shaped blade with small stem, Middlesex county.
25,426-34 Pottery fragments, Middlesex and Elgin counties.
25,435 Adze, E. Missouri. F. Hunt.

25,436 Celt, also used as a cord smoother, (?) Tillsonburg. C Wilcox.
25,437 Celt, with pit on upper and lower surface, showing that it had served as a hammer stone, Grovesend, Elgin county.
25,438 Iron tomahawk. C. Wilson, Tillsonburg.

From 25,439-26,085. From Walter M. Dick, Brantford.
25,439 Clay pot. Only relic found in grave in which there were nine skeletons. The grave was four feet deep and was covered by a pine stump eighteen inches in diameter. Walker farm, lot 10, con. 3, Onondaga township. In former reports owing to misinformation, the Walker and Sealey, (or Sealy) farms, were stated to be in Brantford township. The farms are near the line between the two townships.
25,440 Bead necklace, grave, Walker farm, Onondaga tp.
25,441-45 Necklaces, (copper beads) birch bark, and coarse cloth, Walker farm.
25,446 Copper vessel, Walker farm, grave.
25,447 Stone chipping-block, Sealey farm, lot 9, 1st range south of Hamilton road, Brantford tp.
25,448 Small mealing stone or rubbing stone, E. W. Vanderlip farm.
25,449 Bone beads, (12 large) from Sealey, Purdy, Walker and Book farms, Brantford and Onondaga tps.
25,450 Arm-bones of young person, with copper bracelet, Teeple farm, Jerseyville, Ancaster tp.
25,451 Slender strip of bone, five inches long, pointed, (needle?) from grave five feet deep, lot 10, con. 3, Onondaga tp.
25,452 Stone axe, lot 9, 1st range, Hamilton road, S. Onondaga tp.
25,453 Iron tomahawk, grave, Walker farm, Onondaga tp.
25,454 Large shell, (Busycon perversum) Walker farm, Onondaga tp.
25,455 Large shell bead, from Busycon perversum, Walker farm.
25,456 String of small glass beads, Walker farm, Onondaga tp.
25,457 Clay pot, Walker farm. A beech root grew around the vessel.
25,458 Tortoise shell, grave, Walker farm, Onondaga tp.
25,459 Iron axe, grave, Walker farm, Onondaga tp.
25,460 Stone hammer, Sealey farm, Onondaga tp.
25,461 Small copper kettle, grave, Walker farm, Onondaga tp.
25,462 Shell beads, (20) graves, Walker farm, Onondaga tp.
25,463 Shell breastplate, Teeple farm, Jerseyville, Ancaster tp.
25,464 Knife, grave, Walker farm, Onondaga tp.
25,465 Copper kettle with contents, grave, Walker farm Onondaga tp.
25,466 Shell of Busycon perversum, grave, Walker farm, Onondaga tp.
25,467 Arrow heads, Sealey farm, Onondaga tp.
25,468 Pipe stone beads, (2 native, 13 venetian glass, and 5 imita-

tion of the native catlinite) grave, Walker farm, Onondaga tp.
25,469 Small breastplate, Walker farm, Onondaga tp.
25,470 Breastplate of shell, grave, Walker farm, Onondaga tp.
25,471 Wooden plate, grave, Walker farm, Onondaga tp.
25,472 Fragments of pottery, Sealey, Purdy, Walker and Book farms.
25,473 Lead vessel, grave, Walker farm, Onondaga tp.
25,474 Bone bead, grave, Walker farm, Onondaga tp.
25,475 Portion of earthern vessel, Sealey farm, Onondaga tp.
25,476 Remains of other large clay vessels, Sealey farm, Onondaga tp.
25,477 Skull, grave, Sealey farm, Onondaga tp.
25,478 Copper vessel, grave, Walker farm, Onondaga tp.
25,479 Wooden spoon, grave, Walker farm, Onondaga tp.
25,480 Comb unfinished, Sealey farm, Onondaga tp.
25,481-4 Combs, graves, Walker farm, Onondaga tp.
25,485 Bone spoon, grave, Walker farm, Onondaga tp.
25,486 Grave, Walker farm, Onondaga tp.
25,487 Arrow points (45), grave, Walker farm, Onondaga tp.
25,489 Knife, grave, Walker farm, Onondaga tp.
25,490 Wampum discs united (14), grave, Walker farm, Onondaga tp.
25,491 Shell ornament, grave, Walker farm, Onondaga tp.
25,492 Paint, grave, Walker farm, Onondaga tp.
25,493 Spoon, grave, Walker farm, Onondaga tp.
25,494-8 Bone needles, Sealey farm, Onondaga tp.
25,499 Tally-bone, Sealey farm, Onondaga tp.
25,500 Bone awl, Sealey farm, Onondaga tp.
25,501 Polished elk tooth, Sealey farm, Onondaga tp.
25,502 Turtle shell, drilled, Sealey farm, Onondaga tp.
25,503 Deer-horn pipe, Sealey farm, Onondaga tp.
25,504 Bone ornament, Sealey farm, Onondaga tp.
25,505 Whistle (?), lot 11, 1st range, south of Hamilton and London rd.
25,506-7 Breastplates of shell, grave, Walker farm, Onondaga tp.
25,508 Colored European beads (74), Walker farm, Onondaga tp.
25,509 Wampum (23) purple discs, made from Venus mercenarie, Sealey farm, Onondaga tp.
25,510 Arrow straightener (deer-horn), Sealey farm, Onondaga tp.
25,511 Deer-horn, Sealey farm, Onondaga tp.
25,512 Deer-horn, Walker farm, Onondaga tp.
25,513-4 Spears, Sealey farm, Onondaga tp.
25,515 Gouge, Sealey farm, Cainsville, Brantford tp.
25,516 Stone axe, from farms adjoining Sealey farm, Onondaga tp.
25,517 Lower jaw bone, grave, Walker farm, Onondaga tp.
25,518 Shell ornament, Sealey farm, Onondaga tp.
25,520 Amulet, found in the fields in vicinity of Sealey farm, Onondaga tp.
25,521 Fish spear, Sealey farm, Onondaga tp.
25,522 Parched corn, Sealey farm, Onondaga tp.

25,523 Reducing stone, Sealey farm, Onondaga tp.
25,524 Worked clay, Book farm, lot 50, Brantford tp.
25,525 Pipe bowl, Sealey farm, Onondaga tp.
25,526 Native cloth, grave, Walker farm, Onondaga tp.
25,527 Copper man (sheet copper or brass), lot 11, 1st range, south Hamilton road.
25,528 Pipe head, Sealey farm, Onondaga tp.
25,529 Image of man's head, Sealey farm, Onondaga tp.
25,530 Image head, Sealey farm, Onondaga tp.
25,531 Copper beads, Sealey farm, Onondaga tp.
25,532 Bone, marked, Purdy farm, lot 56, con. 3, Brantford tp.
25,533 Peculiar chisel, lot 56, con. 3, Brantford tp.
25,534-5 Pipe bowls, Sealey farm, Onondaga tp.
25,536 Breastplate, grave, Walker farm, Onondaga tp.
25,537 Grooved axe, lot 7, 1st range, south, Hamilton road.
25,538 Iron bracelet, grave, Walker farm, Onondaga tp.
25,539-41 Bracelets, grave, Walker farm. The band bracelet is from Teeple farm, Jerseyville, Ancaster tp.
25,542 Deer-horn pin, Sealey farm, Onondaga tp.
25,543 Copper kettle, grave, Walker farm, Onondaga tp.
25,544 Skull, grave Walker farm, Onondaga tp.
25,545 Wampum, graves, Walker farm, Onondaga tp.
25,546 Tower pipe, grave, Walker farm, Onondaga tp.
25,547 Tower pipe, grave, Walker farm, Onondaga tp.
25,548 Copper pipe, grave, Walker farm, Onondaga tp.
25,549 Pipe bowl, grave, Walker farm, Onondaga tp.
25,550 Pipe, grave, Walker farm, Onondaga tp.
25,551 Stone pipe, grave, Walker farm, Onondaga tp.
25,552 Pipe, clay, Walker farm, Onondaga tp.
25,553 Pipe, grave, Walker farm, Onondaga tp.
25,554 Stone pipe, grave, Walker farm, Onondaga tp.
25,555 Owl pipe, stone, grave, Walker farm, Onondaga tp.
25,556 Common pipe, Sealey farm, Onondaga tp.
25,557 Pipe bowls, Sealey farm, Onondaga tp.
25,558-66 Pipes, graves, Walker farm, Onondaga tp.
25,567 Stone pipe, Sealey farm, Onondaga tp.
25,568 Pipe, Teeple farm, grave, Jerseyville, Ancaster tp.
25,569 Pipe, grave, Teeple farm, Jerseyville, Ancaster tp.
25,570 Pipe, grave, Walker farm, Onondaga tp.
25,571 Copper pipe (sheet), grave, Walker farm, Onondaga tp.
25,572-81 Pipes, grave, Walker farm, Onondaga tp.
25,582 Bone spoon, grave, Walker farm, Onondaga tp.
25,583 Slate ornament, bird amulet, Brantford tp.
25,584 Pipe, part broken, grave, Walker farm, lot 10, con. 3, Onondaga tp.
25,585 Pipe bowl, Sealey farm, Onondaga tp.
25,586 Rim of copper kettle, grave, Walker farm, Onondaga tp.
25,587 Specimens of lower jaw-bone, grave, Walker farm, Onondaga tp.
25,588 Shell, grave, Sealey farm, Onondaga tp.
25,589 Pottery marker, Sealey farm, Onondaga tp.
25,590 Iron axe, grave, Walker farm, Onondaga tp.

25,591 Conch shell, grave, Walker farm, Onondaga tp.
25,592 Bone articles, Sealey farm, Onondaga tp.
25,593-4 Awls, Purdy farm, lot 56, con. 3, Brantford tp.
25,595 Slate ornament, found near Sealey farm, Onondaga tp.
25,596 Axe, iron, reduced, Sealey farm, Onondaga tp.
25,597 Bracelet, Teeple farm, Jerseyville, Ancaster tp.
25,598 Copper ring, grave, Walker farm, Onondaga tp.
25,599 Ring, Sealey form, Onondaga tp.
25,600 Spoon, Sealey farm, Onondaga tp.
25,601 Spear, Sealey farm, Onondaga tp.
25,602 Pendant, grave, Walker farm, Onondaga tp.
25,603 Heart-shaped shell, Teeple farm, Jerseyville, Ancaster tp.
25,604 Rattle, grave, Walker farm, Onondaga tp.
25,605 Rude pipe head, Sealey farm, Onondaga tp.
25,606 Unfinished bead, Sealey farm, Onondaga tp. This was found in creek.
25,607 Animal skin, perhaps moose, with long hair attached. From a grave, Brant county.
25,608 Bone bead, Sealey farm, Onondaga tp.
25,609 Arrow point, grave, Walker farm, Onondaga tp.
25,610 Smooth stone, Sealey farm, Onondaga tp.
25,611 Perforated turtle-shell ornament, Sealey farm, Onondaga tp.
25,612-8 Some strings of wampum (shell beads), Walker farm, Onondaga tp.
25,619 Two strings of wampum, all discoidal, and of European make (in Albany or Schenectady, N.Y.)
25,620 Two discoidal beads, black and of material resembling anthracite coal, Walker farm, Onondaga tp.
25,621 String of slender Venetian glass beads, red, and from an inch and a quarter to two inches long. The beads are cylindrical, Walker farm, Onondaga tp.
25,622 String of eighteen Venetian glass beads, cylindrical and square in cross section, all red, Walker farm, Onondaga tp.
25,623 String of long cylindrical and small globular, blue, (Venetian) glass beads, Walker farm, Onondaga tp.
25,624 String of red, cylindrical, Venetian glass beads, Walker farm, Onondaga tp.
25,625 String of small red, blue and striped Venetian glass beads, Walker farm, Onondaga tp.
25,626 String of short cylindrical wampum, native make, Walker farm, Onondaga tp.
25,627-39 Strings of beads, mixed native and European, Walker farm, Onondaga tp.
25,640 Twenty-three large bone bead and tally bones.
25,641 Thirty-six large bone beads and tally bones.
25,642-47 Slate gorgets found in fields in vicinity of Sealey farm, Onondaga tp.
25,648-51 Long beads made from the columella of Busycum perversum. From a grave on Walker farm, Onondaga tp.
25,652-5 Long bone beads, grave, Walker farm, Onondaga tp.

25,656-60 Portions of wooden spoons, graves on Walker farm, Onondaga tp.
25,661 Wooden spoon, from grave on Walker farm, Onondaga tp.
25,662 Perforated piece of turtle shell, Sealey farm, Onondaga tp.
25,663-77 Horn pins, Sealey farm, Onondaga tp.
25,678 Phalangal bone of deer, ground down on one side, Purdy farm, lot 56, con. 3, Brantford tp.
25,679-83 Shell ornaments, from graves on Walker farm, Onondaga tp.
25,684 Copper wire spiral ornament, Sealey farm, Onondaga tp.
25,685 Combined drill and scraper, grave on Walker farm, Onondaga tp.
25,686 Scraper, grave on Walker farm, Onondaga tp.
25,687-703 War points, grave on Walker farm, Onondaga tp.
25,704-713 Bone awls, Walker farm, Onondaga tp.
25,714 String of beads (12) made from vertebræ of a large fish, Sealey farm, Onondaga tp.
25,715 Beads still attached to original string, Walker farm, Onondaga tp.
25,716 Stone pipe, from a grave on Sealey farm, Onondaga tp.
25,717-23 Three chert arrowheads, piece of copper, iron knife, iron chisel and awl. All from a grave on Sealey farm, Onondaga tp.
25,724 Pipe bowl, Sealey farm, Onondaga tp.
25,725 Fragment of what appears to have been a pipe bowl, rectangular in cross section, Brant county.
25,726-50 Pottery fragments, various places in Brant county.
25,751 Portion of a large clay vessel, Sealey farm, Onondaga tp.
25,752-57 Worked deer-horns, Brantford, Onondaga tp.
25,758-849 Flints, various places in Brant county.
25,850-60 Bone awls, etc., various places in Brant county.
25,861 Awl, made from the bill of a large bird, Brant county.
25,862-69 Fragments of plastron of a turtle, (sp.?) Brant county.
25,870-72 Pipe bowls, Sealey farm, Onondaga tp.
26,086 Soapstone pipe, lot 15, con. 5, Eldon tp., N. Victoria. Plowed up thirty-seven years ago by the late Mr. Torrie. G.
25,873-81 Pipe bowls, Brant county.
25,882 Worked pottery clay, Brook farm.
25,883-86 Bone needles, Brant county.
25,887-88 Iron awls, grave on Walker farm, Onondaga tp.
25,889-906 Celts and adzes, various places in Brant county.
25,907 Iron axe, Brant county, grave on Walker farm, Onondaga tp.
25,908 Iron axe, Brant county.
25,909 Shell of Busycum perversum, Walker farm, Onondaga tp.
25,910 Part of what appears to have been a crucible, which might have been used by the early French traders or missionaries.
25,911-12 Unio shells, Brant county, from graves.
25,913 Shell beads (31), Sealey farm, Onondaga tp.
25,914-17 Four catlinite beads, native make, Sealey farm, Onondaga tp.

25,918 Eighty-five European glass beads, Sealey farm, Onondaga tp.

25,919-26,084 Wampum made by Europeans, Sealey farm, Onondaga tp.

26,085 Iron knife, Walker farm, Onondaga tp.

26,086 Soapstone pipe, lot 15, con. 5, Eldon tp., N. Victoria. Plowed up thirty-seven years years ago by the late Mr. Torrie. G. E. Laidlaw.

26,087 Animal head, probably from bowl of pipe, lot 23, con. 1, site 24, Brown's Fenelon tp. G. E. Laidlaw.

26,088 Clay pipe, lot 23, con. 1, site 24, Brown's, Fenelon tp. G. E. Laidlaw.

26,089 Bead made from clay pipe stem, lot 23, con. 1, site 24, Brown's, Fenelon tp.

26,090 Animal foot-bone, gambling, lot 23, con. 1, site 24, Brown's, Fenelon tp.

26,091-9 Clay discs used for gambling purposes, lot 23, con. 1, site 24, Brown's, Fenelon tp.

26,100 Bone needles, lot 23, con. 1, site 24, Brown's, Fenelon tp.

26,102 Bone beads, lot 23, con. 1, site 24, Brown's, Fenelon tp.

26,107 Skull (Indian), grave, township of Blanshard. W. J. Wintemberg.

26,108 Copper axe, found by Mr. Corey H. Redden, on lot 33, con. 2, township of Ernesttown, Lennox county. H. S. Davy, Odessa.

26,109 Bone bead. This article may be taken as an evidence that bone beads were dyed by the Indians, and that one method of so doing was by winding fibrous material round the bone spirally before dipping the specimen into liquid coloring matter.

26,110 Arrowhead of argillite, Dominica, West Indies. Very Rev. Dean, W. R. Harris, D.D.

26,111 Skull of buffalo bull, collected by Mr. Nash, Lethbridge, Alberta. Presented by O. E. Windsor, Lethbridge.

26,112 Skull of buffalo cow, collected by Mr. Nash, Lethbridge. Presented by O. E. Windsor, Lethbridge, Alta.

From 26,113 to 26,170 presented by Fred Birch, Wodehouse.

26,113-26,137 Twenty-five flints from various places in Ontario.

26,138 Stone adze, lot 9, con. 6, Euphrasia, Grey county.

26,139 Stone adze, Maple, Vaughan tp., York county.

26,140 Slate axe or chisel, eight inches long, one and three-quarter inches wide, and three-quarters inch thick, Vandeleur, Grey county.

26,141 Small axe (short and thick), Maple, Vaughan, York county.

26,142 Small and well formed stone axe, Maple, Ont.

26,143 Stone adze (roughly quadrangular in cross section), Maple, Vaughan tp.

26,144 Roughly made stone axe or chisel, slight pits or hollows on one side.
26,145 Stone axe, Valley of Beaver river, Euphrasia, Grey county.
26,146 Stone axe, well formed, Chinguacousy, Peel county, Ont.
26,147 Stone axe, found at Maple, Vaughan tp., county of York.
26,148 Stone adze (very large) found on lot 16, con. 3, Euphrasia.
26,149 Stone axe (broken) found at Maple, Vaughan tp., York county.
26,150 Stone axe, found at Maple, Vaughan tp., York county, Ont.
26,151 Slate gouge of Huronian slate (somewhat rare materal for this purpose) and from a more northerly locality than any other tool of this kind in the museum. Clarksburg, Collingwood tp.
26,152 Stone chisel, found at Chinguacousy, Peel county.
26,153-4 Two small stone axes, Grey county.
26,155 Bar amulet-degraded. This specimen (of Huronian slate) seems to have fallen into the hands of someone who has spoiled the end holes and begun to make others along the base. From near Coleraine, Vaughan tp., York county.
26,156 Roughly chipped axe of Huronian slate. Only the edge ground or polished, lot 7, con. 7, Euphrasia, Grey county.
26,157 Very thin slate cutting tool, probably a salmon knife. From Ladner's Landing, British Columbia.
26,158 Spindle-whorl or perforated disc. From Whitchurch, York county.
26,159 Fragment of pottery, Clarksburg, Collingwood tp., Grey county.
26,160 Fragment of pottery, Clarksburg, Collingwood tp., Grey county.
26,161 Wampum. From ossuary at Kleinburg, Vaughan tp. With these were found three hundred skulls, and four or five copper kettles.
26,162 Clay pipe bowl. From Clarksburg, Collingwood tp., Grey county.
26,163 Clay pipe bowl. From Clarksburg, Collingwood tp., Grey county.
26,164 Very tiny clay pipe bowl, one-half inch long, and one-half inch wide. Probably a child's toy. From near the old fort, Midland, Ont.
26,165 Clay pipe bowl, found near the old fort, Midland, Ont.
26,166 Arrowhead (well shaped, but imperfect), lot 5, con. 6, Euphrasia, Grey county.
26,167-8 Two scrapers found at mouth of the Humber river, near Toronto.
26,169 Arrowhead of argillite. Ladner's Landing, British Columbia.
26,170 Arowhead well shaped, lot 17, con. 7, Euphrasia, Grey county.

26,171 Four stone, nine shell, two bone, and eight glass beads, Mitchell farm, Brant county, John Clark, Onondaga. Dr. A. Hamilton, Toronto.

26,172-9 Eight roughly chipped chert pieces, having an extremely paleolithic appearance. These are part of a cache found on the farm of Wm. Charlton, near Ilderton, London tp. Rev. C. Barltrop.

26,180 Half of a very fine gorget found on lot 7, con. 7, Euphrasia tp., Grey county. Fred Birch.

26,181 Unfinished slate gorget, north half lot 15, con. 12, Blenheim tp. A. Hall, per W. J. Wintemberg.

26,182-3 Pottery fragments bearing curved lines, near Otterville, Norwich tp. W. J. Wintemberg.

26,184 Pendant bearing incised pictographs. Lot 8, Beasley's New Survey, Waterloo county. H. Z. Smith, per W. J. Wintemberg.

From 26,185-26,247 Presented by Fred Storry, Smithdale, Ont.

26,185-99 Fragments and cuttings of large shell, lot 12, con. 7, Nottawasaga.

26,200 Eighteen shell beads, lot 12. con. 7, Nottawasaga.

26,201-2 Bear's teeth. Lot 12, con.7, Nottawasaga.

26,203 Wolf's teeth. Lot 12, con.7, Nottawasaga.

26,204 Left side upper tooth of beaver. Lot 12, con.7, Nottawasaga.

26,205 Unfinished stone pipe head, of black limestone, in which are numerous small corals. Lot 12, con. 7, Nottawasaga.

26,206 Fragment of limestone pipe bowl, on which is carved a form, probably representing a lizard. Lot 12, con. 7, Nottawasaga.

26,207 Limestone pipe somewhat imperfect. Lot 12, con. 7, Nottawasaga.

26,208 Stone pipe, carved to represent a human head and arms: the head projecting from the rim. The stem is broken and a new hole is bored in base for the insertion of another stem. Lot 12, con. 7, Nottawasaga.

26,209-12 Fragments of stone pipe stems. 26,209 is of soapstone. 26,210 is of heavy spar. The other two are of limestone. Lot 12, con. 7, Nottawasaga.

26,213-18 Clay pipe bowls somewhat imperfect. 26,217 is formed to represent an upturned face, the open mouth of which forms the bowl. It resembles 6,864 in our collection from the same locality. Lot 12, con. 7, Nottawasaga.

26,219 Clay, human head from bowl of pipe. Lot 12, con. 7, Nottawasaga.

26,220 An unusually formed portion of what was probably a clay pipe stem. Lot 12, con. 7, Nottawasaga.

26,221-30 Clay pipe stems. Lot 12, con. 7, Nottawasaga.

26,231-39 Stone beads (red stone). Lot 12, con. 7, Nottawasaga.

26,240-41 Long stone beads. Lot 12, con. 7, Nottawasaga.

26,242 Fragment in dark red stone of what seems to have been an animal form. Lot 12, con. 7, Nottawasaga.

26,243 Stone disc, two inches in diameter, and three-sixteenths of an inch thick. Lot 12, con. 7, Nottawasaga.
26,244 Very elegantly and ingeniously formed bone harpoon, six inches long, with four barbs. Lot 12, con. 7, Nottawasaga.
26,245 Small red stone pendant; once much longer; somewhat turtle like. Lot 12, con. 7, Nottawasaga.
26,246 Twelve European glass beads from an Indian village site. Lot 12, con. 7, Nottawasaga.
26,247 Iron tomahawk in good condition, each side marked with three impressions of a stamp like 10.

26,248 A small and somewhat modern looking black stone pipe. Kamloops, British Columbia. W. C. Perry, Winnipeg.
26,249 Isa-dunk'wa, used by Onondaga Indians to stretch muskrat hides. It is made of witch hazel ((oo-eh-nah-kwen-ha'-he.) Some are made of arbor vitae or white cedar (oo-soo-ha'tah). The ends are fastened with a strip of the inner bark of the basswood (ho-ho'sa), and the hide was fastened at the bottom with a strip of the same material. W. J. Wintemberg.

26,250 Short, crooked knife, iron blade and ivory handle. Herschel Island, Eskimo. Rev. I. O. Stringer.
26,251 Large bone spear head, without blade, Eskimo, Herschel Island. Rev. I. O. Stringer.
26,252 Eskimo eye shade. Herschel Island. Rev. I. O. Stringer.
26,253 Lock fish-hook, used by Loucheux Indians of Fort McPherson. Rev. I. O. Stringer.
26,254 Eskimo throwing stick. Herschel Island, mouth of Mackenzie river. Rev. I. O. Stringer.
26,255 Undetermined. Herschel Island, mouth of Mackenzie river. Rev. I. O. Stringer.
26,256 Eskimo (Noonatagmiot tribe) spear, from Arctic coast, used in killing whales, seals, deer, moose, and other animals when swimming in rivers or lakes. Rev. I. O. Stringer.
26,257 Eskimo oomiak, or woman's boat model, Herschel Island, mouth of Mackenzie river. Rev. I. O. Stringer.
26,258 Eskimo kayac (model), Herschel Island, mouth of Mackenzie river. Rev. I. O. Stringer.

26,259 Purse of East Indian nurse (ayah). David Boyle.
26,260-65 Bone heads. British Columbia. Cary W. Hartman.

26,266 to 26,345 presented by Dr. T. W. Beeman.
26,266 Very fine gouge, Baptiste Lake. J. Tysick, per Dr. T. W. Beeman.
26,267 Unfinished axe, Misissippi Lake. A. McCoy, per Dr. T. W. Beeman.
26,268 Gouge, lot 8, con. 1, Bathurst tp. Lanark county. G. Ritchie, per Dr. T. W. Beeman.
26,269 Quartzite arrowhead, Talon Lake, Lanark county. Geo. Hone, per Dr. T. W. Beeman.

26,270 Brownish colored chert knife, lot 14, con. 5, Lanark tp. Lanark county. J. W. Borrowman, per Dr. T. W. Beeman.
26,271 Chert knife, Lanark county. Geo. Ritchie, per Dr. T. W. Beeman.
26,272 Leaf-shaped chert object, lot 4, con. 7, Drummond tp., Lanark county. J. W. McIntyre, per Dr. T. W. Beeman.
26,273 Chert knife, lot 26, con. 7, North Burgess tp. P. Bennet, per Dr. T. W. Beeman.
26,274 Chert knife or scraper, North Burgess tp. P. Bennet, per Dr. T. W. Beeman.
26,275 Black chert knife, lot 19, con. 9, Drummond tp., Lanark county. Dan McKeown, per Dr. T. W. Beeman.
26,276 Arrowhead, Lake Rideau. Ernest Jameson, per Dr. T. W. Beeman.
26,277 Arrowhead, Jones Falls, Lanark county. Dr. T. W. Beeman.
26,278 Quartzite arrowhead, lot 13, con. 10, N. Elmsley tp., Lanark county. Wm. Gilchrist, per Dr. T. W. Beeman.
26,279 Flint scraper, Talon Lake. Geo. Hone, per Dr. T. W. Beeman.
26,280 Slate chisel, Talon Lake. Geo. Hone, per Dr. T. W. Beeman.
26,281 Arrowhead, lot 25, con. 6, Fullerton tp. John Butters, per Dr. T. W. Beeman.
26,282 Soapstone pipe, Rideau Lake. Geo. Hone, per Dr. T. W. Beeman.
26,283 Part of slate implement, lot 25, con. 10, Bathurst tp., Lanark county. Chas McKay, per Dr. T. W. Beeman.
27,284-98 Chert and quartz arrowheads, etc., Rideau Lake. Dr. T. W. Beeman.
26,299 Arrowhead, peculiar form, Rideau Lake. D. T. W. Beeman.
26,300 Rough unfinished stone axe, Rideau Lake. Dr. T. W. Beeman.
26,301-2 Two small celts, Rideau Lake. Dr. T. W. Beeman.
26,303 Very fine adze, Rideau Lake. Dr. T. W. Beeman.
26,304-6 Fragments of clay pipe bowls, Rideau Lake. Dr. T. W. Beeman.
26,307 Pottery fragment, Rideau Lake. Dr. T. W. Beeman.
26,308-9 Bone awls, Rideau Lake. Dr. T. W. Beeman.
26,310 Bone pin, Rideau Lake. Dr. T. W. Beeman.
26,311 Bone, sawed in preparation for making beads, Rideau Lake Dr. T. W. Beeman.
26,312 Bone tube, Rideau Lake. Dr. T. W. Beeman.
26,313 Scraper made of quartz, Rideau Lake. Dr. T. W. Beeman
26,314 Fragment of stone pipe, Rideau Lake. Dr. T. W. Beeman.
26,315 Fragment of stone gouge, Rideau Lake. Dr. T. W. Beeman.
26,316 Small stone celt, Rideau Lake. Dr. T. W. Beeman.
26,317 Fragment of stone implement, Rideau Lake. Dr. T. W. Beeman.

26,318 Stone implement, Rideau Lake. Dr. T. W. Beeman.
26,319-21 Stone implements, Rideau Lake. Dr. T. W. Beeman.
26,322-45 Pottery fragments, Rideau Lake. Dr. T. W. Beeman.

26,346 Chert drill, Illinois. David Boyle.
26,347-513 Arrowheads, Southern Indiana. David Boyle.
26,514-16 Perforators, Southern Indiana. David Boyle.
26,517-24 Scrapers, Logan county, Central Illinois. David Boyle
26,525 Fragment of pipe bowl, Central Illinois. David Boyle.
26,526-30 Four adzes and one gouge, near Midland. David Boyle.
26,531-35 Prehistoric pottery from cliff dwellings near Baker's Butte, Yarafai county, Arizona. J. W. Benham, Phœnix, Arizona.
26,536 Bone and iron arrowhead spliced. David Boyle.
26,540 Skull (Indian) lot 4, con. 2, Edwardsburg, Ont. Rufus Froom, Cardinal, Ont.
26,541-43 Leg bones (Indian), lot 4, con. 2, Edwardsburg, Ont. Rufus Froom, Cardinal, Ont.
26,544 Roughly blocked out animal form in Huronian slate, probably intended for a pipe. Somewhat resembling 11,103, but possessing a better finish. Its greatest height is six and three quarter inches, breadth three and a half, and thickness one and three-eighths. It was found on the farm of Mr. Leith, in the township of Binbrook, South Wentworth; by exchange from Mr. Cary W. Hartman, Cincinnati, O.

26,545 Skull, perforated with six holes, Wormian bones, no under jaw. Dr. J. E. Brown, Arkona, Ont.
26,546 Skull, perforated with three holes. Imperfect. Of person probably eighty years of age. Dr. J. E. Brown, Arkona, Ont.
26,547 Skull. Dr. J. E. Brown, Arkona, Ont.
26,548 Skull. Imperfect lower face, under jaw missing. Wormian bones on right side of occipital suture. Dr. J. E. Brown, Arkona, Ont.
26,549 Frontal bone of child's skull. Dr. J. S. Brown, Arkona, Ont.
26,550 Shoulder blade, vertebræ, and six arm and leg bones from the grave where the skulls were found. Dr. J. E. Brown, Arkona.

26,551 Musical instrument, eight bamboo tongues mounted on an ornamented burnt-wood box 11x3½ in. and 1½ in. deep, Kroo Coast, West Africa. Dr. James F. Boyle, Toronto.
26,552 Money pouch, ornamented leather. Procured from a native's person, off Gold Coast, W. Africa. Dr. Jas. F. Boyle.
26,553 Ju-ju or fetish. Carried by natives on going to war in Southern Nigeria. Bight of Benin, Africa. It is worn suspended around the loins for luck. "White men's bullets no good—no live, when we wear this." Dr. Jas. F. Boyle, Toronto.

26,554 Fragment of pottery, plain, reticulated pattern. Dead river bank, surface find, Volusia, Florida, U.S.A. R. J. Bonner, B. A., De Land, Fla.

26,555-60 Flint and jasper chips from implements. 26,558 is a beautiful chip of silicified coral. Volusia county. R. J Bonner, B.A., De Land, Fla., U.S.A.

26,561-72 Arrows of chert, jasper and chalcedony (surface find).

26,573 Large, well-made, and slightly grooved stone axe, lot 7, con. 3, North Orillia. Amos Rogers, Washago.

26,574 Plain, and much weathered stone axe. Has the appearance of being unusually old. Lot 7, con. 13, North Orillia. Amos Rogers, Washago.

26,575 Small, flat and somewhat rudely made stone axe. J. Sandow, per W. H. Elliott, B.A., Toronto.

26,576 Egg-shaped, water-worn stone, from village site, Clarksburg. May have been used as a club head, but shows no sign of workmanship. Frederick Birch, Wodehouse.

26,577 Gorget or tablet, broken. Remaining hole is unusually large—nearly three-eighth inches in diameter, flaring to five-eighth inches on one side. Mr. Samuel Wiley, lot 7, con. 7, Euphrasia, per F. Birch, Wodehouse, Ont.

26,578 Gorget or amulet (two holes), from village site near Clarksburg. Frederick Birch, Wodehouse. This somewhat remarkable specimen is simply a water-worn stone, the almost perfect symmetry of which has attracted the attention of some Indian, who bored the holes through it. Frederick Birch, Wodehouse, Ont.

26,579 Left half of an ox-shoe, Mud Turtle Lake. Frederick Birch, Wodehouse, Ont.

26,580 Chert arrowhead, unbarbed, with long neck, Tamworth, Addington county. Rev. W. H. Adams.

26,581 Bone awl or needle, from near Clarksburg, Ont. Frederick Birch, Wodehouse.

26,582 Unfinished soapstone pipe, slightly curved, from shore of Dalhousie Lake, Lanark county. Dr. Beeman, Perth, Ont.

26,583 Rubbing-stone, found on the shore of Dalhousie Lake, Dalhousie township, Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,584 Probably the portion of a stem of a pipe known as the platform pipe, an unusual form in Ontario. Dalhousie Lake, Dalhousie township, Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,585 Rubbing-stone, in which some round object has been smoothed or polished, Dalhousie Lake, Dalhousie township, Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,586 Woman's slate knife (semi-lunar). Dalhousie township, Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,587 Part of a gorget with two holes. Dalhousie township, Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,588 Slate knife (arrow-head shaped), Dalhousie township, Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,590-1 Small lance-shaped specimen commonly known as a pottery marker. Dr. Beeman, Perth, Ont.

26,592 Piece of soapstone cut and broken from a larger portion, showing the method of separation, Dalhousie tp., Lanark county, Ont. Dr. T. W. Beeman, Perth, Ont.

26,593 Small and well made stone axe or chisel, Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,594 Stone axe found on the shore of Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,595 Small axe of felsite, sharpened at both ends, roughly made but well polished, shore of Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,596 Small gouge, only slightly hollowed, Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,597 Small stone axe, Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,598 Small stone chisel, four inches long, tapering rapidly to the head, Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,599 Very small and somewhat roughly made chisel. Specimens of this kind may have been fastened to the heads of clubs, Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,600 Clay pipe head, with four deeply sunk depressions around the bowl. Dr. Beeman, Perth, Ont.

26,601 Piece of clay pipe stem, Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,602-31 Arrowheads of chert and quartzite, various sizes and shapes, from Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,632-33 Two scrapers, found on the shore of Lake Dalhousie, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,634-59 Fragments of pottery bearing characteristic patterns, belonging to Eastern Ontario, Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,660 Fragment of pottery very peculiarly marked, shore of Dalhousie Lake, Dalhousit tp., Lanark county. Dr. T. W. Beeman.

26,661 Roughly chipped specimen of felsite, probably a reject. Found on shore of Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman.

26,662 Small well made slate gouge, hollowed its entire length, the opposite side having an unusually large angular appearance, with a high ridge. Dalhousie Lake, Dalhousie tp., Lanark county. Dr. T. W. Beeman, Perth, Ont.

26,663 A fragment five inches in length of what has been an extremely large and well finished slate knife, although only a quarter of an inch thick in the middle; at the fracture, where

it is one and three-eighth inches wide, a distinct central ridge extends from end to end; shore of Dalhousie Lake, Dalhousie tp., Lanark county. Dr. Beeman, Perth, Ont.

26,664 Small steatite pipe, two inches long, almost straight, bowl very thin, workmanship good, shore of Dalhousie Lake, Dalhousie tp., Lanark county, Ont. Dr. Beeman, Perth, Ont.

26,665 Skull of native woman, Queensland, Australia. Collected by Mr. G. Scovell, Toronto. This specimen bears several marks of blows received while the person was alive.

26,666 Pipe head, stone, stem broken. North West Territory. David Boyle, Toronto.

26,667 Small clay vessel from ruined city in Butler Wash, Utah. Collected by Don. McGuire, Ogden City, Utah. David Boyle, Toronto.

26,668 Pendant or gorget of mottled slate; one hole. Mr. Alfred Willson, C.E., Toronto.

26,669 Spearhead or very large arrowhead of black chert, broken front, Grand River, Pilkington tp. David Boyle, Toronto. Ont.

26,670-76 Six small flints from Northstoke, Oxfordshire, Eng. David Boyle, Toronto.

26,677 Flint scraper, Thames Valley, England. David Boyle, Toronto.

26,678-9 Two large flint flakes, may have been used as scrapers Thames Valley, Oxfordshire, England. David Boyle, Toronto.

David Boyle, Toronto.

26,680 Large flint flake bleached, Bignor Hill, Sussex, England.

26,681-90 Worked specimens of flint, Surrey Hill, England. David Boyle, Toronto.

26,691-2 Paleoliths, Wandsworth Drift, Thames Valley, England. David Boyle.

26,693-4 Flint flakes, Ightham, England. David Boyle, Toronto.

26,695 Oval paleolith, Bois de Rocher, St. Helens, Cotes du Nova, France. David Boyle, Toronto.

26,696 Stone pipe, has originally had a human figure carved on the front side of the pipe, with the head looking towards the smoker. The head is now broken off, and the edge has been rubbed down smoothly. From near the Southwold earthwork, Elgin county, Ont. David Boyle, Toronto.

26,697 Stone pipe, probably limestone, quadrangular in cross-section, lower end pointed, upper edge ornamented with two projecting bands. Upper edge notched in middle of each side. Near Southwold earthwork, Elgin county. David Boyle, Toronto.

26,698 Clay pipe bowl, Vaughan tp., York county, Ont. David Boyle, Toronto.

26,699 Hudson River shale pebble, one and three-eighth inches long, one inch wide, and one-half inch thick, rudely carved to represent a human head. What may have been the suspension hole is bored in the place of the mouth. Richmond Hill, York county, Ont. David Boyle.

26,700-1 Two bone needles or awls, Lansing, York tp., York county. David Boyle, Toronto.

26,702-6 Five flints, Waterloo tp., Waterloo county. David Boyle. Toronto.

26,707-11 Small stone chisels, York tp., York county. David Boyle. Toronto.

26,712 Piece of soapstone, probably intended to be a pipe stem. On three sides of the specimen are the beginnings of drillings probably made with a wooden drill, Rideau Lake, Lanark county. David Boyle.

26,713 Flint or chert drills, near Aurora, Indiana. David Boyle. Toronto.

26,715 Lance-shaped spear or arrowhead, nearly four inches long, near Aurora, Indiana. David Boyle, Toronto.

26,716 Lance-shaped spear or arrowhead, near Aurora, Indiana. David Boyle, Toronto.

26,717-8 Two arrowheads with serrated edges, near Aurora, Indiana. David Boyle, Toronto.

26,719 Skull (calvarium) and imperfect underjaw, lot 14, con. 6, Whitchurch, York county. George Nelson, Toronto.

26,720 Stone axe; lot 14, con. 6, Whitchurch tp., York county. George Nelson, Toronto.

26,731-2 Fragments of pottery, lot 14, con. 6, Whitchurch tp., York county. George Nelson, Toronto.

26,733 Woman's waist cloth of native grass, in alternate, longitudinal, plain, stripes of red and pale yellow, Guinea Coast, Africa. David Boyle, Toronto.

26,734 Four gambling sticks, probably Athabascan (N.W.T.,) David Boyle, Toronto.

26,735 Two gambling sticks, probably north-western. David Boyle, Toronto.

26,736-7 Two desiccated, or mummified bodies from British Columbia. J. A. Coates, Victoria, British Columbia.

26,738 Skeleton, (disjointed) of what was a mummified body, from British Columbia. J. A. Coates, Victoria, B.C.

26,739-53 Fifteen flints from Logan county, Central Illinois, U.S. Most of these are very well made, and vary in size from an inch and a half to five and a half inches in length. David Boyle, Toronto.

WHO MADE THE EFFIGY STONE PIPES?

All the people are not yet dead who are gullible enough, or ignorant enough to believe that iron tomahawks, brass pots, silver ornaments, glass beads, and numerous other articles of European origin were made by the Indians before white men appeared on the continent. When certain beliefs were current, attributing to our "natives," Jewish, Irish, Welsh, Phœnician, Egyptian and Mongolian ancestries there was something like a method in the madness of the theorists; but now-a-days we have, or rather, some of us have, adopted views calculated to make it appear that although there may be nothing in the extraneous-origin theory, yet the Indians belonging to this part of America were indebted to European influence for inspiration affecting some very simple devices.

It has recently been asserted with an attempt to show proof, that all our Indian smoking pipe forms, except the straight one, are of European origin; or, to put it in another way, that to the influence of European contact is attributable all the forms in question, as well as the effigy styles of ornamentation. This is equivalent to the contention that those who had sense enough to contrive the simplest form of device, viz.,—a straight tube, for the consumption of tobacco, were so utterly devoid of ingenuity, or of adaptability, or of taste, as to be unable to take another step—such a step, for example, as would be necessary in the case of a piece of stone, which, not being perfectly straight, would require the boring of a hole from each end to meet at the angle or curve. However slight any variation of this kind might have been, it would be sufficient to originate the notion of two holes meeting at any angle, and thus, in process of time, to suggest a bowl and stem at right angles to each other.

But there was another way by means of which a modification of this kind could have been brought about. A bit of stone may have been very desirable for the bowl of a pipe, but lacking material to form a long enough stem, or, indeed, any stem at all. Here, then, the savage's knowledge of woodcraft would stand him in good stead, and it would not demand very great inventive genius to think of boring a hole in the side of the bowl to receive a twig of alder, or other wood from which the pith had been removed. We have numerous examples of both very short-stemmed, and of stemless stone pipes, or pipe bowls, in our museum cases. In one instance the perforation is at the base of the bowl and almost in line with it, but most of the stemless examples are bored at right angles. In the oldest forms of short-stemmed specimens, the bowls and stems form angles more or less obtuse, while in those that are of unmistakably recent origin they are at right angles, or nearly so.

This is not by any means an attempt to show the evolution of the typical form of pipe from the cigar holder through the straight stone tube, but is merely to emphasize a statement of the belief that without any European influence, and long before there was any on this continent, the aborigines were capable of producing and did produce, a multiplicity of shapes and "conceits" in this line of work.

If, to what has already been said, we add that smoking has probably always possessed some ceremonial or worshipful significance to many American peoples, we have a very powerful argument favoring the independent modification and ornamentation of pipes.

Nothing, however, can be clearer to even a beginner in the study of American archæology than that a very large number of tobacco pipes owe much, if not everything, to British, French, Spanish and Dutch contact with the Indians. Sometimes this shows itself in the shape alone, but quite as frequently in connection with the character of the workmanship, and the style of ornamentation.

It is but fair to state that in what I regard as the very oldest graves I have seen opened there were no pipes of any kind. At first sight this seems to favor the view that pipes were not in use among the Indians at the time the ancient interments were made, but this conclusion would be too sweeping, for, although those who made the graves in question may have adopted the smoking habit, it may not have been their custom to put pipes in graves at burial times. In any event, it would be quite as logical to affirm that the absence of flints and celts from graves in Ontario, indicates that the people whose graves these are, were not possessed of such weapons or tools.*

That a good many pipes evidence European influence would seem to be regarded as conclusive that *all pipes of common form so originated*, but this is absurd. The shape having developed from the straight to the angular form, thus reached its highest possible development in a general way, but in matter of outline and of ornamentation the possibilities were illimitable, and why deny to our Indian the ability to produce more than simple and unadorned objects of this kind? We know that he was extremely fond of personal decoration, and no portion of his outfit was dearer to him than his pipe was.

It might not be easy to affirm whether clay or stone pipes had precedence as an invention, but in either case people who had skill and taste enough to produce a vessel of pottery decorated with pigments, or with incised lines, or to make what we designate as bird-amulets, and various other forms of so-called "ceremonial" objects, may safely be credited with sufficient sense and taste not only to vary pipe forms, but to adorn them. It would, therefore, appear much more reasonable to assume that the Indians had exemplified their art and craft in this way, perhaps, for many centuries before the Discovery; that numerous examples of such workmanship found their way to Europe as curiosities; that in course of time, when smoking became the vogue, Indian art was imitated and improved upon, and that when the white man's pipes, imitating those of the aborigines, casually found their way to America, the Indians, whol-

*These are very seldom found associated with human remains, yet they must have been in very common use. A remarkable find of "flints" (all very large) was made in a burial mound on Tidd's Island, opposite Gananoque, by Mr. C. A. See, in 1887. These are now in the Provincial Museum, having been kindly presented by Mr. See. A similar find was made in a grave on Wolfe Island. These, too, are in the museum. In both cases, and in those of the Rice Lake mounds, already referred to as being amongst the oldest graves I have seen opened, copper beads and other articles of this metal were found.

ly oblivious to their own priority in this line, adopted many hints. We may go even further, and take it for granted that not a few stone pipes were manufactured in the Old World for trading purposes in the New.* It is, of course, undoubted that many white men, on this continent, either for amusement or for profit, made stone pipes, and it may quite readily be admitted that whenever it was within his power, the Indian would adopt the European methods of working, and, if possible, with European tools, but this is a totally different thing from asserting that until the advent of the white man there was no variety in the native pipe-form; and, therefore, there could be no attempt to adorn what did not exist. Just here, it may be asked, why so little is said with respect to clay pipes in this discussion? Why should not the very same arguments apply to them in a large measure? Were all American clay pipes quite straight until the unintelligent native happened to see a curved, or a right-angled specimen in the hands of a pale-face? Among upwards of five hundred clay pipes in the Ontario Provincial Museum, less than *two per cent.* can, by any stretch of imagination, be regarded as bearing any resemblance to the oldest forms of English and French pipes as we may see such in collections, and we have only one at all likely to suggest a straight ancestry. It is three and a half inches long, very rudely made, covered with sharply incised lines at right angles, and is so slightly curved that on the concave side the middle is less than one-fourth of an inch lower than the ends. Of course, the convex side shows considerably more curve—fully half an inch—but the general appearance is that of straightness.

On not one of the small percentage of European-looking pipes is there any kind of ornamentation beyond three, or sometimes, four parallel lines traced round the top of the bowl, while a few are absolutely plain; and this is true, too, respecting the pipes that have more or less flared lips—the so-called cornet or trumpet specimens, which are also, on not very tenable grounds, claimed by reversionists, to owe their peculiar shape to an aboriginal idea suggested by the sight of some brass wind-instrument, or from the imitation of a pipe modelled similarly, as the result of a brilliant conception on the part of some white man, just as if no such flare had ever been produced by Indian women many thousands of times in the making of pottery vessels for domestic use, we cannot even venture to guess how long, before 1492. We may not have to wait a great while until some knowing some very knowing—archæologist makes the announcement that clay pots of all kinds were totally unknown before the days of the Niña, and the Pinta, and the Santa Maria, the cooks of which caravels first inspired the natives potterywards by exhibiting to them the iron and copper utensils in their respective galleys, for who could be foolish enough to suppose that a savage would ever evolve such notions of æstheticism as are exemplified, not only in the fashioning of such graceful forms as we sometimes find, but in

*It is somewhat remarkable that notwithstanding the imputed European influence, we never find any effigy pipes of Old World material among objects that are clearly of British, French, or Dutch origin. Was it only in America that the European produced pipes of this kind?

the decoration of them by means of incised or colored designs; imitations of human and other heads, and purely ornamental lip crenations and projections: to say not a word about such pre-eminently European ideas as are embodied in occasionally supplying these vessels with loop-lugs?

Fortunately for the intellectual reputation of the Indian, through his womankind, the art of making pottery was probably the first native industry to fall into complete disuse in this part of America, on account of the immense number of brass vessels that were introduced by white adventurers during the early years of the exploratory and fur-trading periods, and although it is not at all improbable that some aboriginal pottery was produced in remote parts of the country subsequent to the time in question, no writer or student as far as I know, has yet had the temerity to impute European influence to this highly characteristic Indian industry, whether with respect to the origin, the form, or the ornamentation of the vessels.

Reverting, then, to clay or pottery pipes, we may ask ourselves the very natural question, Why should we admit the greater measure of skill, artistic excellence, and versatility which were exemplified in the production of pots, while we deny the lesser measure of these qualities in producing pipes?

Another query suggests itself, namely, How is it that little or nothing betokens European influence on clay pipes? It certainly does not appear on the square mouthed pipe; there is no sign of it where the very common, conical-headed, ape-like, sitting figures occur, nor can it be detected in connection with the various animal representations—bird as well as mammal—on the bowls. Now and again, where the human face is attempted as a model, the work is so well done as to suggest at first sight the probable presence of a white man not far away, but closer examination compels one to admit, that after all, there is nothing in the work beyond the power of a bright savage of mature years.

When we come to stone pipes, however, it must be acknowledged that the case is somewhat different, for without any doubt, many such are either wholly of white man's make, or show in some way the influence of Indian contact with the white man. Voyageurs and commercial adventurers of all kinds, no doubt, speedily acquired the smoking habit after their arrival on this continent, and nothing can be more reasonable than to suppose that during their hours of enforced idleness in camp, or on the trail, they would relieve the tedium by carving suitable pieces of stone into pipe bowls—a work of comparatively easy accomplishment with chisels, drills, saws, and files of steel. Indeed, even with nothing but a stout pocket-knife an ingenious or handy man could readily fashion very desirable objects of this kind from pieces of limestone and soapstone, the materials from which many pipes were made. In some cases, no doubt, such pipes were produced as articles of barter with the natives, or as gifts to their leading men. In any event, the Indians similarly equipped in the matter of tools would very soon profit by the example, and produce for himself equally serviceable and ornate pipes. In this way we may account for the capped, bonneted, and hatted

representations of human heads, and for the general tone in other specimens that are totally devoid of extraneous carving, as, for example, where the bowl is so accurately cylindrical as to indicate the use of a turning lathe; yet, some of these, too, may have been made wholly without the use of such machine.

It is, as a matter of course, implied even when not directly stated, by those who assert their belief in the post-discovery origin of most pipe forms, that all such objects were manufactured with the use of steel tools. It is claimed that many of the details could not be worked out otherwise, and much is very properly made of the file-marks that exist on some pipes. Agreeing to the logic of this reasoning, we demand that a similar line of argument be employed when dealing with stone pipes that not only show no tool marks, but that on the contrary bear evidence of having been brought into shape by purely aboriginal methods. Undoubted examples of this kind are found in unfinished specimens, exhibiting purely primitive methods of shaping, boring, sawing and polishing; and the pipes are not straight, but angular, or sharpely curved. The nearest unfinished approach to straightness in our collection, is in one, the bowl and stem of which form an angle of forty-five degrees. In the largest and most rudely chipped specimen of this kind we have, there is proof the maker's intention to carve a head or something else on the inner edge of the lip, in which case it would probably have faced the smoker.*

It may be advanced that the new fashion travelled faster than did the tools required to make the pipes, but a statement of this kind possesses not a shred of value when everything else associated with the unfinished objects indicates a period anterior to the Discovery, and if it be contended that even without the European appliances, the Indian succeeded in making very good articles similar in style, it is, then, virtually conceded that he was gifted with sufficient ingenuity and skill to have produced just such pipes without foreign inspiration.

The evolution of the angular pipe through the straight form, from the cigar was inevitable, even among people gifted with much less intelligence and mechanical ability than our Indians were, and a similar statement may be made respecting the ornamentation of these objects, which lent themselves quite readily to decorative skill, and which, as being connected with religious or ceremonial usages, were treated with more artistic consideration than were most other products of their handicraft.

In a recent work by Mr. Joseph D. McGuire, of Washington, D.C.† he takes the ground that until after the Discovery, the Indians

*Dr. W. M. Beauchamp is of the opinion that pipes having carved faces turned from the smoker are of a more recent date than are those that look stemwards. See figure 2 See also remarks accompanying figure 4.

†This volume, "Pipes and Smoking Customs of the American Aboriginies, based on material in the United States National Museum," is an exhaustive study of the subject. Mr. McGuire deserves the most cordial thanks of every ethnological and archæological student, for the great pains he has taken to bring together such an immense amount of information reative to the use of tobacco and tobacco pipes on this continent, and although most of us may not agree with his contention, that all curved stone pipes, and, indeed, every pipe

had no pipes but straight ones, and that no attempt had been made to decorate pipes with carvings of animal forms until the hint was given by white people. On p. 513 of this volume a reprint from the Report of the U. S. National Museum, pp. 351-645, and fully illustrated, the following passage occurs:—

"It does not appear to have been considered remarkable that the carving of pipes with such great skill should be practically the only example of American Indian art; and it may be questioned whether the small size of the pipes, thereby enabling them to be carried by the owners, sufficiently explains why pipes alone show this skill, fine carving being almost, if not entirely, unknown in other aboriginal stone objects from the area where these pipes are most often found.

"It may, with pertinence," he proceeds, "be asked why we do not find in the mounds other images of stone finished with the skill of the mound pipe, if they are of Indian origin? The religious or superstitious feeling of the seventeenth century would draw the line at idol-making, whereas pipe manufacture would be a legitimate occupation."

This is a lame and impotent conclusion based on false premises, and how much so, would have appeared to Mr. McGuire himself, if it had only occurred to him to read what he had written in the following slightly amended form:—"It does not appear to have been considered remarkable that the carving of pipes with such great skill should be practically the only example of European art displayed on American Indian objects; and it may be questioned whether the small size of the pipes, thereby enabling them to be carried by their owners, sufficiently explains why pipes alone show this skill, fine European carving being almost, if not entirely, unknown in other aboriginal objects from the area where these pipes are most often found.

"It may with pertinence be asked why we do not find in the mounds and graves other images of stone finished with the skill of the carved stone pipes, if they are of European origin. Although the religious or superstitious feeling of the seventeenth century would draw the line at idol-making, not only pipes but scores of other aboriginal stone objects might have been carved as a legitimate occupation by Europeans."

If Mr. McGuire will kindly permit me to use his language in what I have called the amended form of his quotation, I shall stand sponsor for it, and await a reply with some degree of expectancy.

Meanwhile, as the original form of quotation seems to contain in epitome the whole of Mr. McGuire's contention, we may examine it bit by bit:—

(*a*) "It does not appear to have been considered remarkable that the carving of pipes with such great skill should be practically the only example of American Indian art." This statement may be best

not of the straight variety, are the result of European contact, we must credit him with having aroused a more critical interest in the subject of early man's workmanship in America, thus sounding a warning note, at quite an opportune time, to the numerous unreasoning theorists who infest literature with their bizarre notions.

met (taking the latter part first) with the assertion that pipes are *not* "practically the only examples of Indian art," unless we limit the meaning of art to the production of animal representations only; but even this is not in accordance with fact, for imitations of animal forms occur on pottery from Peru in the south to Ontario in the north. In Mexico, examples of this kind are innumerable, and in Arkansas they are not infrequent. Are all such due to European contact? If not, why should we exclude the possible spread of effigy notions among peoples in contiguity?—and, when Mr. McGuire refers to the lack of consideration that has been manifested respecting the fact that so much more attention has been given to the carving of animal figures on pipes than on other objects, the only reply is, that nothing seemed to us more natural than to regard pipes not only as special objects of regard on the part of the Indians, but as articles, which, from their very shape, offered excellent opportunities for carving imitations of human faces, and of many lower animal forms. Thus it was not "considered remarkable" that pipes were carved "with such great skill" in the matter of animal forms. In addition to this, it may be stated, that not a few students are disposed to regard the representations as possessing a totemic value, and it might be rash to deny to some pipes a significance of this kind, for although there may not be a particle of evidence in favor of the theory, we cannot but admit its possibility on most reasonable grounds.

(*b*) "It may be questioned," writes Mr. McGuire, "if [whether] the small size of the pipes, thereby enabling them to be carried by their owners, sufficiently explains why pipes alone show this skill, fine carving being almost, if not entirely, unknown in other aboriginal stone objects from the area where these pipes are found." I have never heard that the small size of the pipes was ever advanced as a reason why they were carved, and as a reason it is too trivial to be worthy of notice—it is smaller than even the very smallest of the pipes— and it has already been stated that fine carving is *not* "almost, * * * * unknown in other aboriginal stone objects from the area where these pipes are most found."

(*c*) As to "why we do not find in the mounds other images of stone finished with the skill of the mound pipe, if they are of Indian origin," the answer has been given under (*a*) and when we come to the last sentence in our quotation we find it so self-contradictory that no reply is needed.

The simple truth appears to be that there are found in mound, ossuary and other graves, pipes that are purely and unmistakable Indian, *i. e.*, without a particle of evidence of any kind to connect them with the white man, while, quite as undoubtedly pipes of European make, or pipes made subject to European influences, have also been taken from such graves. In either case, the trouble lies in hasty generalization, and a similar difficulty is likely to arise when the contents of a burial place, or of any other deposit, are of a mixed character.

If there is no doubt that Indians lived, and died, and were buried; and that the burials were in some cases, if not in all, accompanied by certain ceremonial usages; and if in places of this kind

we discover a well-made piece of pottery, an elegantly formed gorget, or a barbed harpoon, why should we hesitate to credit the American savage of these northern parts with a measure of the mechanical ability that we so willingly concede to a very large extent where Maya, Aztec, and Inca "civilizations" are concerned? In any case, we must use judgment, aside from theory, by taking into account the particular circumstances connected with our find. We should not be disposed to deny a pretty large amount of intellectual ity to a race of people capable of *inventing* a birch-bark canoe, but, perhaps it will yet be shown that no canoes existed until the natives of Guanahani or Watling Island, or some other place, had seen the pinnace in which Captain Colon rowed ashore to pay his respects to their chief!

Under the following heads is a crude scheme of evolution showing one way in which, to the writer, it seems possible to trace the pipe's ancestry, without forgetting for a moment how precarious it is to theorize when the missing links are so numerous.

1, Smoking is an American aboriginal custom which originated, no one knows how long, before the Discovery.

2. All the aboriginal peoples did not smoke.

3. Those who smoked did so ceremonially rather than for solace.

4. The custom may have been brought about in some way from the almost universal veneration connected with fire.

5. The rising of smoke may have been suggestive of a means of communication between the upper and lower worlds—between the earth and the sun.

6. The production of smoke through the mouth, perhaps, resulted from blowing small quantities of tobacco (or other vegetable material) when ignited on the ground, or, in the hand.

7. A wooden tube through which to blow would prove serviceable, or,

8. The plant-leaves put in proper shape could be held in the mouth, as a cigar.

9. In either case inhalation and expulsion of smoke from the mouth would soon accompany mere exhalation, or blowing.

10. The use of a tube would suggest an enlargement at one end to hold the material, instead of blowing at it on the ground, or,

11. The tube may have originated as a holder for the cigar.

12. A bent, or crooked wooden tube (bamboo, or pith-stem) would afford the necessary hint for convenience to a smoker when standing or sitting.

13. When crooked stems were not procurable, a hole bored in the side of a piece meant for a bowl, would serve to receive a smaller piece to hold in the mouth. In some such simple way,— a way that requires not much inventiveness on the part of the savege, and no stretch of imagination on ours,—it is probable the idea of an angular pipe was hit upon.

14. With a knowledge of pottery, clay pipes, in imitation of the compound (stem and bowl) wooden pipe, would follow as a matter of course.

15. Decoration by means of straight, incised lines, or by lines

made round the bowl, were probably suggested by a similar style of ornamentation on pottery vessels.

16. Decoration in relief would be brought about also from clay vessels.

17. Perhaps stone pipes came in after clay pipes, but the straight, stone tube is found where the art of pottery-making was not known, *e. g.*, British Columbia.

18. Old writers refer frequently to "stone" pipes which were almost certainly made of clay. Many intelligent people make a similar mistake yet.

19. Unfinished stone pipes show conclusively that many such were made by primitive methods of sawing, flaking, pecking, rubbing and boring.

20. Some of the best stone pipes exhibit much skill in bringing out animal features, yet a close examination of them, with the aid of a magnifying glass, yields no sign of marks requiring the use of anything but primitive tools to produce them.

21. Other stone pipes were just as certainly the work of white men, or, of Indians with European notions and European tools.

22. Pipes of white man's make were imitated by Indians when they could employ the white man's tools.

23. That the Indians did so is not by any means a proof that all their ideas respecting the shapes and ornamentation of these articles were derived from white men.

24. To admit that our Indians were indebted to Europeans for every notion respecting the shapes and decorative devices in pipe-making is to deny that the aborigines possessed any imagination, or much mechanical ability, and, therefore, that all the so-called "bird-amulets," and "boat-amulets," and "banner-stones" of so many patterns, and "gorgets" of shapes innumerable, and stone tubes from two to twelve inches in length, *not* intended for smoking pipes; to say nothing of the axes, the adzes, and chisels, and gouges, or of the multifarious shapes we find in bone and shell, are, without exception, products wholly beyond the inventive capacity of such natives as inhabited the basins of the St. Lawrence, the Hudson and the Ohio, which is absurd.

THE WORKING OF NATIVE COPPER.

The presence of copper among Indian relics has, for a long time proved a wonderful source of inspiration to those whom Dr. C. A. Peterson, of St. Louis, in a recent paper on Mound Builders, calls "half-baked archæologists," some of whom regard it as proof that the copper-workers were a superior people who preceded the Indian we know, and whom the latter exterminated. Coupled with this belief were some others; one was that specimens of this metal found in the shape of tools had been cast in a stone mould; and, another, that they had been hammered into shape—a stone "set" or swage having been used to regulate the shape. As it was claimed also that tools of this kind were tempered, we often hear the statement made that the edge of such an implement was so hard that "you couldn't touch it, (*i.e.*, mark it) with a file."

One might readily forgive a theorist whose knowledge of primitive Indian life led him to attribute a knowledge of smelting, and consequently, of casting, to the aborigines, but what should be said of those who either have tested, or having had the opportunity and appliances to test, the quality of a copper weapon, or tool, continued to insist on its marvellous hardness as a result of tempering?*

We now know, just as well as it is possible to know anything with respect to Indian working methods, that prior to the appearance of the white man, the natives in this part of America were totally ignorant about either smelting or melting metallic substances, or of anything respecting the use of moulds; and that with regard to tempering copper they were destitute of all knowledge whatever, in which respect they were no more ignorant than civilized man is to-day, and has always been, while nothing can be more grossly outrageous than the statement that they understood the art of welding this metal.

We are, perhaps, warranted in supposing that our Indian discovered for himself that the sudden cooling of hot copper rendered it softer and more malleable, just as he must have learned that

* The latest reference of this kind I observe in the St. Louis *Republic* of Sept. 6, 1903, containing an elaborate review of two books written and printed by a Rev. Dr. E. S. Curry, who lives "In the seclusion of the Ozark mountains." For this reference I am indebted to Dr. C. A. Peterson.

The writer of the editorial, no doubt inspired by the venerable author's own assertions, states that "the most interesting relic in Doctor Curry's collection is a tool made of copper and tempered harder than steel. . . .It has a handle of copper welded on the blade. Both the welding of copper and the tempering of this metal are lost arts, proving that the races which inhabited this continent thousands of years ago, were highly civilized, and, it is claimed by Dr. Curry, were far in advance of the races of to-day." Elsewhere, it is related that "a small oblong object" was discovered "cemented in the centre of a curious-looking rock" and that "this record is on tempered copper, three sides being covered with hieroglyphics, and the whole scarcely an inch square. The event recorded thereon occurred ten thousand and forty six years ago, according to Dr. Curry's reckoning."

Really, when a man can calculate cupiferous, prehistoric dates so accurately, it would seem almost impertinent to characterize his statements as either knavish or foolish when he asserts that not only did the Indians temper copper but that they actually knew how to weld it, more than ten thousand years ago!

pounding the metal when cold, with a stone, caused it to split or crumble; and his knowledge of results from hammering may have taught him to reduce his material if necessary, by laborious methods of cutting and sawing, to something near the shape of the desired object, before he began to use his hammer-stone. The chief objection to this supposition is, as far as I am aware, that no specimens have been found showing such a stage of progress in his work. In this connection, however, we must not lose sight of the strong probability that the native workman would, at the outset of his operations, choose a piece of copper corresponding in some measure to the size of the object he intended to make, for it should be borne in mind that the native or virgin metal assumes all sorts of jagged or ragged forms *in situ*. It is, thus, comparatively easy to find connected with large lumps or masses, pieces that are readily detachable and suitable for the making of small objects such as beads and arrow-points, without an excessive amount of hammering.

Of late there has been a slight reaction in connection with the tolerably high estimate some have been disposed to place on aboriginal, artistic and mechanical achievements. Reference is made elsewhere in this report to the disputation with respect to pipes; and Mr. Jos. D. McGuire, who has stated his belief that all but the simplest form of pipes are of European origin, directly or indirectly, has also asserted the opinion that sheet copper ornaments, whether plain or embossed, owe their existence to the white man's influence.* In the course of Mr. McGuire's remarks replying to Mr. Clarence B. Moore in the *American Anthropologist*, Vol. 1, p. 47, 1903, the statement is made that "when copper is found in thin sheets and those sheets are embossed and ornamented with repoussé work; and when spearheads are furnished with sockets, and the sockets are furnished with nail holes, we may safely assert that white influences are proven." In this country we are concerned, in a general way only, with the difference of opinion respecting plain and embossed sheet-copper, but it may not be out of place to offer a few remarks on this phase of the discussion before referring to the portion of Mr. McGuire's statement which more closely affects Canadian copper specimens.

It would seem to be taken for granted by some writers, that all the North American Indians except, perhaps, the Mexican peoples, had, long before the Discovery period, reached a condition of non-progressiveness. It is tacitly admitted that a good deal of advancement must have been made at one time, either on this continent or somewhere else, for although our natives were properly enough regarded as savages, they were, as a rule, of a much less degraded type than many we know about in other portions of the world. Now, if we concede a measure of progressiveness to the Indian here, up to a certain time, whether he was truly aboriginal, or merely the remote descendant of some long-forgotten ancestors from beyond the Atlan-

* *The American Anthropologist*, vol. 5, Jan.-March, 1903, contains a discussion on "Sheet Copper from the Mounds." It is contended by Mr. Clarence B. Moore, of Philadelphia, that the sheet copper found by him in the mounds of Florida is of purely native origin, while Mr. Jos. D. McGuire, of Washington, holds that it has been produced subject to European influences.

tic on the one hand, or the Pacific on the other, why should we argue that in process of time he came to a dead stop?† It is not likely that such a view holds good even when much less advanced peoples are concerned. The potentiality involved in the taking of one step warrants the belief that another step is not only possible but probable. In very low conditions of society steps thus taken may be short and with long intervals, but variation of environment means progress or extinction to all living things. It has never been asserted that when Europeans reached America there was any indication or any likelihood of the aborigines disappearing, notwithstanding that something like chronic warfare was waged among many tribes of them. On the contrary, there is reason to believe that not a few tribes or "nations" pursued tillage to some extent, and were peacefully inclined. We know that some lived on the sea-coast, and some inland; some on the plains, and others among the hills; some where four-footed game was plentiful, and many depended to a large extent on lake, or sea, or river fish. Then there were dwellers in warm as well as in cold latitudes, and there were without any doubt, those of cosmopolitan tastes—rovers; others who had been, or were, captive slaves, besides thousands who were, for various reasons, adopted. Aboriginal life therefore, was not on a continental dead level, although there was undoubtedly much sameness. In such conditions, therefore, as have been adverted to, an Indian must have proved an unusually low specimen of our race, if he failed to accommodate himself in some measure to his surroundings. It is absolutely certain that he did so accommodate himself, and it is scarcely necessary to adduce any proof to this effect. Mere mention may be made of the birch-bark, elm-bark, and solid wood canoes; of the bark and the skin wigwams, and teepees; of pottery and basketry in multitudinous variety; of stone axes and adzes, plain and grooved; of stone gouges, or hollow adzes; of stone beads and numerous other forms of personal decorations in the same kind of material, as well as in bone and shell; and, in every case, of such a character as to preclude the remotest suspision of European provenience.

We are hazarding no wild guess when we surmise that primitive man's inventiveness was chiefly the result of hints afforded by natural conditions, or by conditions arising from inevitable changes in his mode of life. In other words, he possessed a measure of adaptation. Having arrived at what he regarded as the best form of any tool or weapon, he chose for his purpose such a piece of material as, with least labor, would yield the desired result. In this way a bit of sheet copper from a fissure would be quite enough to suggest to the aboriginal mind this or that use, to which such material might be applied. Copper in this condition is not infrequently found. For a good many years I had a specimen of this kind about three inches long and from an inch-and-a-half to two inches wide, much thinner

†It is not overlooked that many instances are known of what appear to be, or to have been, absolutely non-progressiveness—lapse dpotentiality—among peoples in various stages of advanvement, but there is no evidence that the natives of America were in this condition.

than any sheet-copper of commerce I have ever seen.* Again, in the making of spear or arrow-heads, it was necessary to hammer or rub the copper so thin that portions of the metal forming the edge of the object would become unduly attenuated. In some such way if in no other the man who failed to get the idea of making a sheet, however small, if he wanted one, must have been in a condition of imbecility we would not expect to find in the case of one who was capable of using a hammer with so much skill. In some similar adventitious manner, the art of embossing may have been suggested.

But it is when the statement is made that "when spear-heads are furnished with sockets, and the sockets are furnished with nail-holes we may safely assert that white influences are proven," that we, in Ontario, are most concerned. It may at once be admitted that a considerable proportion of native copper tools and weapons, more especially those made with sockets, show in their production a greater degree of skill than is usually credited to the Indian, and it is not at all unlikely that in some cases the objects in question were either of white man's make, or the result of the native smith applying white man's methods. The socket is pointed to as a proof of "white influences." Now, what is a socket? It is simply the opposite of a tine, or tang—a bearing to receive a handle, instead of being received by one, and a device of this kind must have been known to the Indian long before he discovered the malleability of copper. At any rate, he employed socketed horn and bone arrows, that is to say, he hollowed the ends of antler-tips, and of bones, or he used in the latter case existing hollows, for the insertion of a shaft. Without this hint, however, it would appear almost impossible to manipulate copper very long without having the idea of a socket suggested. The hammering of the edges of a flattened piece would tend to curvature, and a very interesting example of this kind is figured by Mr. Clarence B. Moore, on page 371 of his last excellent volume, "Certain Aboriginal Mounds of the Florida West Coast, and of the Apalachicola River."† In this example the workmanship is rude enough in character to be regarded as purely aboriginal, yet we are not to conclude that the maker had any notion of forming a socket. Having beaten the virgin metal out until the edges were too rough and jagged to hold in the hand, the workman simply hammered them down, and, in so doing, they naturally took a curved form, because the material was too thin to receive directly the full force of the blows. Such a circumstance as this, was, in itself, enough to suggest the socket idea, for there was the receptacle, and what could be more natural than to think of pushing a stick into it, just as one would slip his foot into a moccasin, or his hand into a mitten.

For a long time, I was, myself, somewhat dubious respecting the ability of a savage to produce such specimens of copper-work as even the small collection in the cases of the Provincial Museum illustrate, but when one takes into account the extreme ductility of this

*Mr. McGuire himself refers on p. 34 to the native metal being found in this form, when he says, "the crude metal is primarily in the condition found in the mine; that is, in the nugget or in the sheet as found in the fissure of the rock."

† "Certain Mounds," etc. Reprint from the Journal of the Academy of Natural Sciences of Philadelphia, Vol. XII. Philadelphia, 1903.

metal, and the comparative ease with which it may be brought very closely to any desired form mainly by cutting, laborious and tedious as the processes may have been, the wonder as to how the work was done ceases to a very large extent. When it is known to us, as Mr. McGuire correctly states, "that almost from the very beginning of the hammering process the metal begins to crumble whether hammered cold or hot,"† we may safely enough credit the Indian with having, in his own crude way, made a similar discovery, and being thus led to conclude that the more cutting and the less hammering he had to do, the better. That he did make use of copper long before he ever saw or heard of a white man there cannot be any reasonable doubt, and it is almost equally certain that in doing so his object was rather to produce articles for personal decoration, than for purposes of utility. Like all others in similar conditions of society, as well as like most of ourselves, he had an eye for natural beauty, and for oddities in such objects as came within his field. A streak, a spot, a glitter, a sheen, a sparkle, an uncommon color, or any peculiarity in form, if usefully or decoratively adaptable, attracted his attention. To him, therefore, a stone that was soft, that he could hammer, that was easily polished, and which, when polished, was so beautifully bright, must have proved a more than commonly desirable thing; and, to those whose habitat was in the neighborhood of such deposits, a highly valuable object of exchange.

It is probable that, as already stated, most, if not all, of the so-called copper "tools" were, in reality, more for ornament than use, or, for employment in usages *ceremonial*, to use what is sometimes a much abused word. As cutting-tools they could not keep an edge as well as those made of chert, or other more purely silicious material; and as spears, arrows or fish-hooks their use must have proved very inadequate when compared with results from less yielding material like stone and bone. Still, it would be rash to assert that copper in implement shape had no practical use, for one may readily imagine various purposes to which tools of this kind might have been applied.

It would appear, therefore, that to cast any doubt on the prediscovery Indian's ability to imitate in copper what he already had before him in numerous forms as the equivalent of sockets in wood, bone, leather and textiles, is to place him in a mentally inferior position as compared with other aborigines, who, with extremely low brain capacity, have produced mechanical devices of marvellously ingenious kinds; and this view of the case is materially strengthened when it is remembered that there is not a particle of evidence to show that sockets are of post-discovery date.

It is also contended that the presence of nail-holes in copper sockets is a reason for the assertion "that white influences are proven." Is it? Much of what has been said respecting the evolution of the socket applies in a modified way to the nail-hole. The use of holes for attachment purposes is an ancient Indian device, as

†*American Anthropologist*, p. 34, Vol. 1, 1903. This statement is a little too strong, for pure copper will bear a good many blows before it shows signs of breaking up.

a substitute for pockets, and we know that cracked pottery and "banner-stones" were held together by means of holes being bored on each side of the fracture for thong-binding purposes. (Figures 29 and 30). Holes were bored through stone and clay discs from one-fourth to one-half of an inch in thickness; similarly, slate tablets or gorgets were supplied with from one to half-a-dozen or more perforations; deep ones had to be made in the production of smoking pipes, and we find stone tubes from two inches to upwards of a foot in length accurately drilled, and sometimes with a much smaller opening at the one end than at the other. We have examples also of fragments of large shells, bored not only sidewise, but edgewise; in the latter way for the purpose of making the kind of bead known to the Iroquois as *runtee*; but, what is still more to the point, we find quite a number of bone harpoons or spears provided with holes for handle-fastening purposes. It may, no doubt, be urged that the last-mentioned device is the result of European contact, but it is quite easy to make a statement of this kind respecting almost anything the Indian ever produced.

It is more likely that holes made in bone harpoon haft-ends were to receive sinews or thongs, rather than anything in the shape of a nail, or of a rivet, and the same may be said with regard to holes in the sockets of copper tools. We, as a matter of course, would use a metal nail, or something in the form of a pin, but it is more probable that the Indian employed a ligament. But, tacitly admitting as Mr. McGuire does, that the "nail-hole" in a socket or in a half socket (for it is this, and not a whole, or closed receptacle, these tools and weapons have), is quite as characteristic of the white man's work as is the socket itself, why is it that so small a proportion of the copper specimens intended for a handle are so provided? Would not the white's influence extend to the hole as well as to the socket which he had taught the Indian to make? Why, then, are there many more non-holed than holed sockets?

That the Indian recognized the difficulty of perforating copper is evident from the somewhat ingenious device he adopted to overcome it in the making of beads, an art which, it will scarcely be claimed he owed to the white man. The material for these he shaped in short bars, "scarfing," as a blacksmith would say, each end; that is, making it wedge-shaped, so that when bent to make the ends overlap, the thickness did not exceed that of the other portions; while an aperture remained in the middle of the simple coil. By this means, too, he succeeded in getting a much smaller hole than if he had attempted to drill it.

But in the perforation of such thin material as the socket of a spear or of an arrow he would meet with no difficulty in boring a hole from an eighth to three-sixteenths of an inch in diameter by means of a flint point, and should anything in the way of suggestiveness have been required, examples must have occurred frequently during the course of the hammering process.

From these and other considerations there would seem to be no doubt that copper manipulation was practised by the Indians long before the Discovery, and that the invention, or application of the socket, as well as the use of a tying-hole, in connection with arrow

and spear-heads, is wholly due to aboriginal ingenuity or adaptiveness.

There is, however, as little doubt that the white trader provided himself with articles of copper as merchandise, just as he is known to have done with wampum and with pipes—a proof, it may be advanced, that all the imitated objects were regarded with more than common esteem by the Indians. In this connection, too, we are absolutely certain that the wampum of white man's make was as close a copy of the aboriginal hand-made article as a turning lathe could produce, because the Indian clearly preferred his own medium of exchange to the metallic and immensely more valuable currency of the European. Intensely conservative as we know our natives to have been (as, indeed, most aborigines are) are we not warranted in claiming that not only white man's wampum, but white man's pipes, and white man's copper tools and weapons were produced in close imitation of Indian workmanship, and to satisfy Indian taste rather than that the whites introduced totally new patterns, and that the Indians gladly adopted them? To admit European intrusion thus, is simply to recognize the trading instinst that has always characterized those of our own race. Birmingham Buddhas, and Manchester calicoes are exported to India, but the Hindus made bronze idols and cotton cloth long before they had any dealings with John Kumpanee. The "coppers" (large sheets of metal weighing many pounds, and peculiar to British Columbian Indians)* were imitated and employed for commercial purposes by the Hudson Bay Company, but these, and other instances of a similar kind that might be adduced, would lend no color to any statement respecting the European origin of Buddhas, and calico and "coppers."

Hitherto there has, undoubtedly been a lack of discrimination with regard to the origin of some American material from places of former Indian occupation, or association, but the equally indiscriminate claim set up by Mr. McGuire will probably lead to a more intelligently critical examination both of future finds, and of much that now reposes in museum cases.

* * * * * * *

Since the foregoing was written, I have had an opportunity to examine two specimens of worked copper, belonging to Mr. H. A. Van Winckel. One is a small axe-blade, three and three-eighth inches long, fully a quarter of an inch in thickness and of the usual shape, tapering from an inch and five-eighths in width at the cutting edge, to seven-eighths of an inch at the poll; the other is a four-barbed spear or harpoon, a little over nine inches wide, and varying in thickness from five-sixteenths of an inch, on the back, to one-eighth along the barbed edge. There cannot be a doubt that both have been made by cold hammering. The scales and laminations resulting from the overlapping and pounding are quite plain, while on the harpoon there has been made an awkward cut with a thick-edged tool, like a stone axe or chisel. On both, are striæ, the par-

*An excellent specimen of one of these very remarkable objects forms part of the British Columbian collection in the Prov. Museum.

allelism of which is strongly suggestive of file use, those on the axe being much finer than use on the spear. Should it prove that the marks in question are the result of files, it would only go to show that the probable Indian workman used for finishing purposes a more effective tool than a piece of sandstone. All the markings on the little axe, except those on the cutting edge, extend from end to end of the implement as if it had been "draw-filed," and are more difficult to account for on the supposition that a steel file was employed to rub it, than that it was rubbed lengthwise over some finely gritty bit of stone.

The barbs of the spear have clearly been made by cutting, as the inner, or lower edges of them are quite rough, which would not be the case had they been filed into shape. The appearance of the inner angle also leads to a similar conclusion.

As Mr. Joseph D. McGuire, the author of "Pipes and Smoking Customs of the American Aborigines," may be properly regarded as the chief exponent of the view that to European influences, the Indian owes his knowledge of effigy-pipe making, as well as of all that is best in the copper-smith's art, he was supplied with a copy of the foregoing article in manuscript, and there can be no doubt that all who are interested in the subject will be much pleased to read the following reply which he has been good enough to make.

Reply to Who Made the Effigy Pipes.

By Joseph D. McGuire.

I am obliged for the privilege accorded me, to print anything I have to say controverting Mr. Boyle's statements contained in this memoir in reference to pipes, as well as to certain copper objects. I know of no one more familiar with these objects than he is, and the subjects being yet in the controversial stage it is only fair to present both sides. It is a pleasure to find that he agrees with me on so many points, yet there are others of radical divergence, to some of which I shall call attention, and shall point out one or more cases in which he does not appear to have properly weighed available material. My publication covered three hundred pages on a subject which had scarcely been touched upon by any prior author; most of the material had to be taken, a sentence here, a sentence there, from a host of old publications relating to early contact with the North American Indian. Much material was gathered and some years were spent in compiling the paper. All references to pipes and pipe customs were copied on library cards, and every item believed to weigh on the subject was preserved. In all, two thousand and more cards were collected, many of which were to a certain extent contradictory of others, yet every extract was used when not a duplicate, nothing was suppressed; in addition much labor was performed with primitive tools, and my own views were freely expressed with little

thought of the controversies which such expression would give rise to, by reason of certain of them being different from accepted beliefs. All pipes were found to be distributed over certain geographical areas; and of the sixteen or seventeen varieties each was found to belong to a particular contiguous area, and with one exception, these areas were small when compared with the whole area of the continent; that exception was the tubular pipe which was found to belong to no particular locality, a strong argument to its antiquity and to its being the original type; they were found to be made of bone, wood, pottery and stone, as well as of wood and stone combined. Other pipes of other forms were found to correspond in a measure with the spheres of influence of French, British, Spanish, etc., and such influences with others led the writer to believe that their shape, the work on them, and the characteristics of the work showed European influences. What the Indian was able to do was not at issue and has not entered the discussion until now, for it will be seen that Mr. Boyle and I agree on the subject as to what the Indian was capable of under the white man's influence. Were extraneous proof of this necessary we have it from Garcillas de la Vega, who says that the native workman soon learned to excel his master in the use of tools. The imitation of the flaring mouth of a trumpet in certain pipes of the Iroquian type is so pronounced, that it is a surprise that one should consider it at all likely to have been evolved from a pottery vessel, for such a flare as occurs in the rim if such pipes is never seen in pottery vessels that have come under the writer's observation.* The assertion that little or nothing betokens European influence on clay pipes raises a question of judgment between us, for to my mind there is no stronger evidence presented anywhere of European influence than is shown in the Iroquoian pottery pipe. The paste from which it is made shows it, the hard burning of the clay strengthens the belief, while the modeling of the figures seen on many of them is typically European, and quite distinct from any clay modeling found elsewhere in America. The heads seen on these pipes are of European type, the heads of birds are treated according to European technic, while the figures often observed on the faces of the bowls are but copies of the sacred pictures in the Catholic churches. Mr. Boyle admits that "Now and again when the human face is attempted as a model, the work is so well done as to suggest, at first sight, the probable presence of a white man not far away, but closer examination compels me," he says, "to admit that after all there is nothing in the work beyond the power of a bright savage of mature years. When we come to stone pipes it must be admitted that the case is somewhat different." I will be glad to have our differences of opinion judged from the above quotation, compared with any assertion in my paper on pipes. To agree that any Indian could model either of the bird pipes illustrated by me from the Douglas or Beauchamp collection, intensifies the belief that he and I look at art from greatly divergent points.

* There are in the Provincial Museum several clay vessels well curved outwardly at the lip, quite as much so, indeed, as are many of the pipes, but not to the same extent as appears on a few of the pipes—still, enough and more than enough to have proved suggestive. D. B.

The subject is one, however, that must be fairly studied, and deliberately judged upon evidence, and the final judgment will then be of value. Mr. Boyle again falls into error in asserting that "It is, as a matter of course implied even when not directly stated by those who assert their belief in the post Discovery origin of most pipe forms, that all such objects were manufactued with the use of steel tools. It is claimed that many of the details could not be worked out otherwise, and much is very properly made of the file marks that exist on some pipes." In this instance, I evidently represent "those who assert," but I do not suggest, nor have I even believed, "that all such objects were manufactured with steel tools." That the pipe can be bored, pecked and ground into shape with primitive tools I long since demonstrated, and exhibited such pipes and examples of the boring, and grinding, and pecking at stone, at Chicago, along with the rude tools employed in the work. It is a pleasure to find that Mr. Boyle agrees that much is properly made of the file marks which exist on some pipes, for a recent author asserts that there are no pipes having file marks on them in the museum, and says the supposed file marks can be easily imitated; naturally, when such a point is reached further discussion becomes distasteful so that others must settle the matter. It may be appropriately stated here, that the type of pipes upon which tool marks are most commonly encountered are usually finished with a glass polish, itself a suspicious feature, they are often so carefully smoothed as to leave no tool marks visible. It was only by observing these file marks in an unfinished specimen that search for others was instituted, and similar marks were found in a sufficient number of instances to satisfy me of the correctness of the opinion expressed which I see no reason to modify.

I am compelled to deny that anterior to the Discovery, the Indian ever "succeeded in making very good articles very similar in style," and consequently cannot "concede that he was gifted with sufficient ingenuity and skill to have produced just such pipes without foreign inspiration."

Mr. Boyle takes issue with my remarks, saying that "it is a lame and impotent conclusion based on false premises" to assert, as I did, and as I reiterate, that "It does not appear to have been considered remarkable that the carving of pipes with such great skill should be practically the only example of American Indian art, unknown in other aboriginal stone objects from the area where these pipes are most commonly found." It is to be remembered here that in the instance quoted I was discussing the curved-base mound-pipe, the bowls of which are commonly carved exquisitely in the shape of men's heads, and of snakes entwined around the bowl, of turtles on the bowl, and of birds and animals of many different species, one bird being represented in the act of feeding. Two hundred such pipes were found by Squire and Davis in a mound in Ohio, all of which, except a very few now in the American Museum of Natural History, are in the Blackmore Museum, in England. These carvings are not approached in artistic skill by anything else in aboriginal American art in stone. That the imitation of animal forms does occur on pottery "from Peru to Ontario" is not germane to the sub-

ject, and no matter how innumerable they may be in "Mexico" or in "Arkansas" it will only be necessary for any one to compare the difference in such animal forms with the forms on these curved-base mound-pipes to be convinced that the one represents savage art, that the other is typical of the finest type of art in carving, as practised in Europe during the colonial period. The imitations of animal forms on pottery, and more pronouncedly such representations on stone in America wherever found of Indian origin, are rude in the extreme when compared with the forms of the figures on the curved-base mound-pipes, with the form of the monitor pipe or with the figures of many of the unornamented effigy pipes, or with many of the Iroquoian clay pipes. One thing strongly influencing me in concluding that the curved-base type of pipe was due to foreign influence was that certain of them were found to have been bored out by means of a tubular cylindrical drill, the end of one of these drills was apparently loose on the shaft, having made a hole of peculiar shape in excavating the bowl. This was almost certainly owing to having been bored by means of the pump drill, an implement not believed by the writer to have been of use in America prior to the coming of the whites. Further, it is known that the mounds have in many instances been found to contain crucifixes, medals, coins and other objects of European origin.

I considered nothing "too trivial to be worthy of notice" and the suggestion that I have done so impresses one with the necessity, which everyone labors under to tell all and to leave nothing unsaid, which even remotely relates to the subject under discussion. What aboriginal invention of the birch bark canoe has to do with the making of pipes, I fail to see.

As to the scheme of evolution of the pipe which Mr. Boyle arranges under numbered paragraphs, I see nothing to criticise up to the 24th paragraph, as it apparently coincides with my own views, nor do I find therein many missing links, though one article at least, namely, stone tubes from two to twelve inches in length, I believe to be drilled by European tools if not machinery, and other of the articles enumerated are deserving of critical study before one would be justified in the expression of a reasonably accurate opinion concerning their origin.

I do not believe that all pipes, but do believe that many pipes, are due to foreign influence in shape and modes of manufacture, and that in shaping many of them the file and other cutting tool of the whites were used. "Now-a-days," says Mr. Boyle, "some of us have adopted views calculated to make it appear that the Indians of this part of America were indebted to European influence for inspiration respecting some very simple devices." I do not hesitate to say that I have no doubt on the subject, and think that a careful reading of what Mr. Boyle has herein written will convince the reader that he has in certain instances practically admitted the case to be so. He opens his paper by showing some of the curious beliefs concerning the American Indian which at one time were considered plausible, but which have since been abandoned; rest assured, there are yet others that must give way to archæological study. Certain objects of stone we know, from recorded history, were presented to the na-

tives by nations; others, we are informed, were traded in, probably wampum, pipes and stone axes or celts. This trade has extended over both Americas, from the earliest period of white contact, but few of us have ever seen a specimen, the owner of which would admit the possibility of its being post Columbian. I am glad to say that mature deliberation convinces me of the correctness of my position originally expressed, and regret not to be able to agree with those who differ with me; one of us must be wrong, but which one is the query?

Notes on Copper Workers.

Jos. D. McGuire.

Mr. Boyle asserts that I have stated my belief that sheet copper ornaments, whether plain or embossed, owe their existence to the white man's influence, and correctly quotes me as saying that "when copper is found in thin sheets and these sheets are embossed and ornamented with repoussé work, and when spear heads are finished with nail-holes, we may safely assert that white influences are proven." It should be remembered that this copper is of great thinness, and is not, as an old writer has said, such as could be bent by the fingers, but is of less thickness than is commercial sheet tin, and of equally uniform surface. Mr. Boyle admits that "he was somewhat dubious respecting the ability of a savage to produce such specimens of copper work as even the small collection in the Provincial Museum illustrates; but," etc. I am not familiar with the contents of the Provincial Museum, though, if its specimens at all resemble, as I presume they do, those in the New York State Museum, recently illustrated by Dr. Beauchamp, they cannot be compared with the sheet copper from Florida, for I cannot see the slightest resemblance between the two. There is, however, a great similarity admitted between the copper from Florida and a sheet of thin copper from a Georgia mound, the figure on which resembles an eagle or hawk with wings spread and head turned to one side. The repoussé work is of a regular, geometric pattern, which suggests, it is believed, some of the characteristics of early European armor. In at least one instance, thin sheet copper was found in a mound said also to have contained the bones of the great auk, and also the bones of a dachshund. Yet, as the copper analysis showed the copper to be of American origin, the probable foreign origin of the bones was ignored as unworthy of consideration.

The brain capacity of the Indian does not properly enter the discussion, nor does the pre-discovery Indian's ability to imitate in copper what he already had before him in numerous forms as the equivalent of sockets of wood, bone, etc., apply. The argument that through centuries of life the Indian would gain a sufficient knowledge to do thus, or so, is a very different proposition from that other

side which suggests the question, Did the American Indian do thus or so?

That holes were drilled in various substances cannot be doubted, but that when such holes were bored they were made for the purpose of binding appears only partially true. Mr. Boyle thinks much "of what has been said respecting the evolution of the socket, applies in a modified way to the nail-holes in it," this argument appears to me insufficient. In an examination of Mr. Beauchamp's illustration of copper objects now before me, those without nail-holes appear more ancient than those with such holes, and the objects with stems or tangs appear more ancient than either. One strong reason for this belief is that the stemmed type is much the more primitive.

It is conceded that it is quite easy to make statements respecting almost anything the Indian ever produced, but on the other hand, it should not be denied that statements are, or should be weighed somewhat in reference to the experience of the individual making the statement.

That the American Indian possessed copper artificially worked no one at all familiar with early American publications can doubt; that he beat and pounded it into sheets is equally true; but that the whites employed copper as one of the principal articles in traffic with the natives is undoubted, but barring the pots, shown to be commonly made of brass, there scarcely appears to have survived a single copper implement made from European copper. Is this not so?

In a recent discussion of this subject, with a friend, he suggests with much force that personal inspection is as valuable a test as any, and good illustration is often quite as valuable.

WORKING METHODS.

Unfinished Stone Pipes.

In figure 1 we have illustrated an unusually large, and otherwise peculiar specimen of what was probably meant to be a pipe-head. It was found on the farm of Mr. Leith, township of Binbrook, county of Wentworth, and was presented to the Provincial Museum by Mr.C. W. Hartman, of Cincinnati. It is of Huronian slate, almost seven inches in height, and four in breadth, having a thickness of an inch and three-eighths at the back of the upper portion, and thinning to seven-sixteenths of an inch near the lowest point.

The large size and corresponding weight of this object scarcely suggest its possibly intended use as a pipe-head. Another specimen (11,103) from the farm of Mr. A. Buie, in Notawasaga township, although somewhat less in size, possesses the same general character, and a finished pipe of monkey-like features (figure 28, report for 1886-7) from the farm of Mr. Findlay McCallum, near Milton, strongly resembles this Hartman specimen in outline. The three make a fairly good series, although differing considerably in size, and form a good illustration of what is well known respecting other examples of aboriginal handicraft, namely, that the whim, or caprice of the workman was largely governed by the size and quality of his material. For a long time there had been some doubt respecting the purpose for which 11,103 (figure 31 in the report for 1888-9) had been made, as the work was not carried far enough to do any boring for the bowl or stem, but in the case of figure 1, the bowl-hole is bored to the depth of nearly half an inch. The beginning of another hole has been made by pecking, perhaps as a start for drilling, above the large orifice in the middle. Most of the surface is quite smooth, showing few tool marks of any kind.

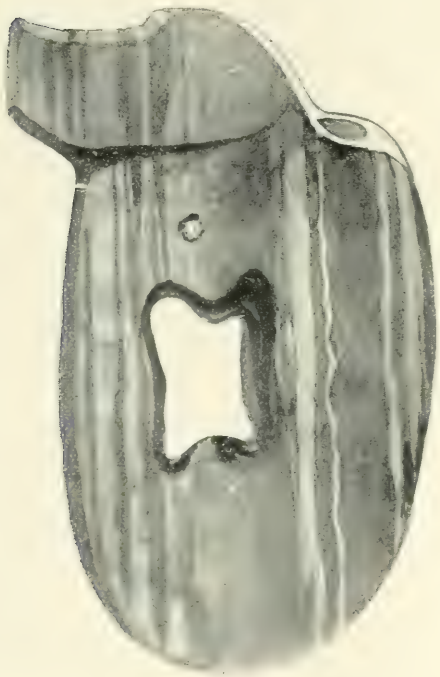
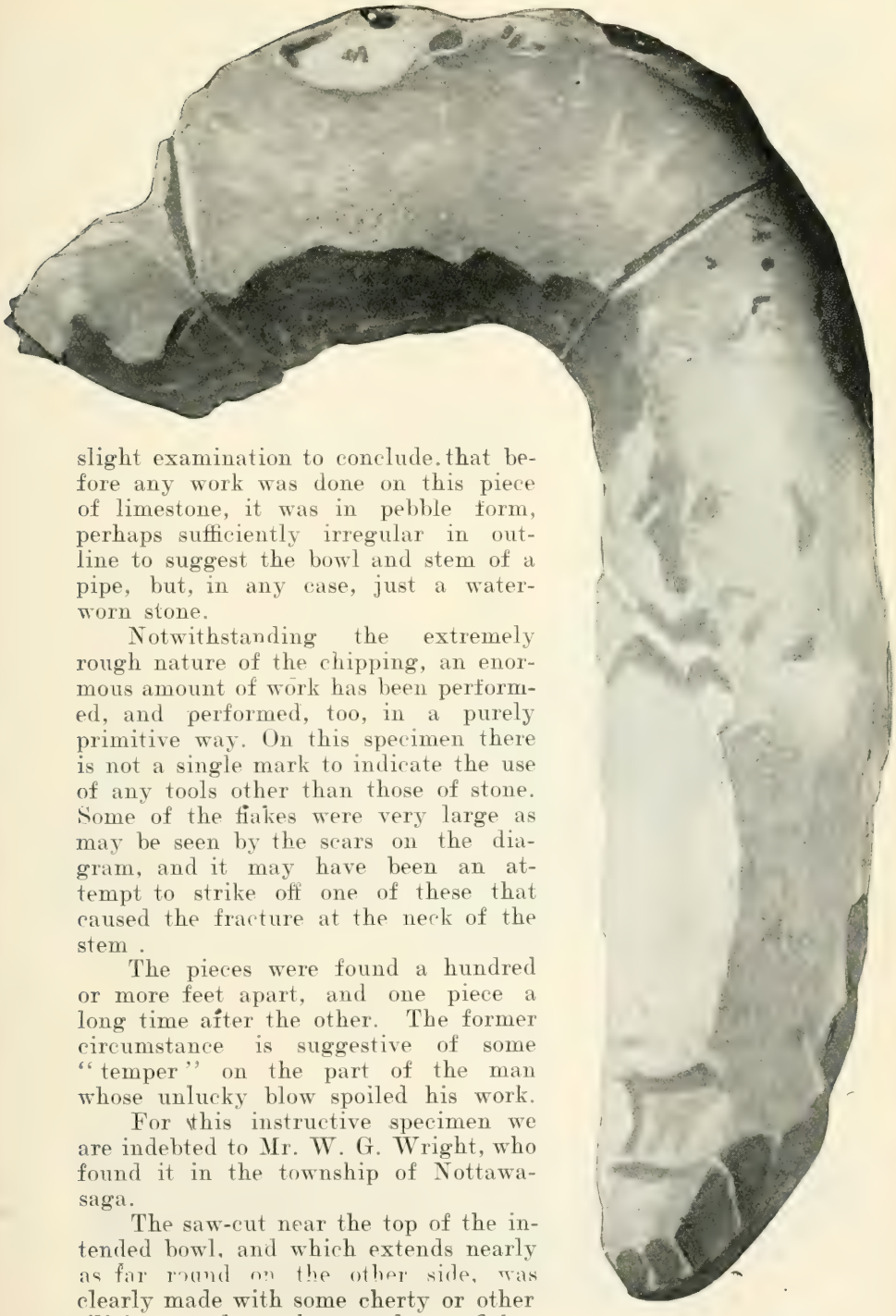


Fig. 1 (26,541 ½ diameter.

There can be no doubt that this unfinished piece of work, figure 2, was intended to be a pipe, and there is just as much certainty that the workman's purpose was to model some kind of animal head on the edge of the bowl overlooking the stem. It requires only a



slight examination to conclude that before any work was done on this piece of limestone, it was in pebble form, perhaps sufficiently irregular in outline to suggest the bowl and stem of a pipe, but, in any case, just a water-worn stone.

Notwithstanding the extremely rough nature of the chipping, an enormous amount of work has been performed, and performed, too, in a purely primitive way. On this specimen there is not a single mark to indicate the use of any tools other than those of stone. Some of the flakes were very large as may be seen by the scars on the diagram, and it may have been an attempt to strike off one of these that caused the fracture at the neck of the stem .

The pieces were found a hundred or more feet apart, and one piece a long time after the other. The former circumstance is suggestive of some "temper" on the part of the man whose unlucky blow spoiled his work.

For this instructive specimen we are indebted to Mr. W. G. Wright, who found it in the township of Nottawasaga.

The saw-cut near the top of the intended bowl, and which extends nearly as far round on the other side, was clearly made with some cherty or other silicious tool, perhaps only a flake,

Fig. 2 (9,801.) Reduced.

either held directly in the hand, or in some way attached to a handle. If, then we regard the quality of the stone, the character of the workmanship, the intention to make a carved pipe, and the design of forming some kind of figure on the bowl, we have all the conditions of a primitive nature that we may, and do usually, suppose accompanied a purely paleolithic method of working, and it is difficult to conceive an Indian workman proceeding in his simple way to form a pipe in imitation of some European model, as has recently been asserted he did.

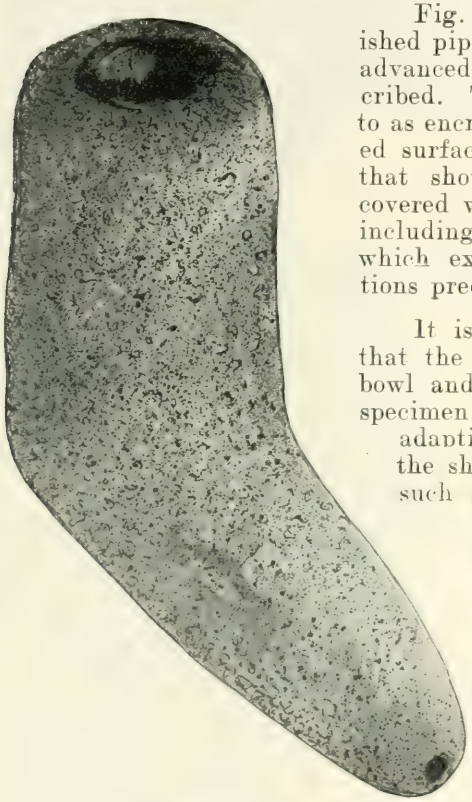


Fig. 3 (24,833). Full size.

Fig. 3 represents another unfinished pipe, but in a considerably more advanced state than the one last described. The material may be referred to as encrinital limestone, the weathered surface, on the opposite side from that shown in the engraving, being covered with a variety of small fossils including corals and bivalves, among which extremely minute crinoid sections predominate.

It is, perhaps, quite safe to say that the obtuse angle formed by the bowl and stem of this yet unfinished specimen is the result of the workman adapting the form of his pipe to the shape of the stone, and this is such a simple mechanical device that it must have occurred to native pipe-makers long before they ever saw or heard of a white man. The bowl is bored to a depth of five-eighths of an inch, and a mere beginning has been made in making the stem-hole.

For this very excellent specimen found on lot 6, concession 2, township of Malahide, we are indebted to our late friend, Mr. R. T. Anderson, whose untimely decease is elsewhere referred to.

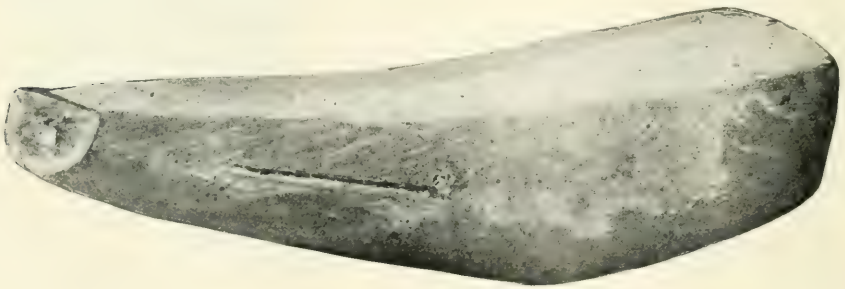


Fig. 4 (26,582). Nearly full size.

Fig. 4 has come to us since the general remarks on stone pipes were written. It is of soapstone, was found on the shore of Dalhousie Lake, Lanark county, and is presented to the museum by Dr. T. W. Beeman, to whom we are already indebted for a large quantity of material. The pipe, or rather what was intended to be a pipe, of which fig. 4 is a slightly reduced diagram, falls almost into the class of straight ones—those that are claimed to be of the oldest kind.

Without attempting to say just how old this specimen is, it may be mentioned that the greater portion of the surface has become patinated, and that it bears numerous examples of parallel striæ such as it is believed may be the result of rubbing with other and grittier stones. A good example of these may be seen on the stem end of the diagram. The deeply cut line on the same side was plainly enough intended as a guide to the eye in boring the stem-hole. Examples of the guide-line are found on some other specimens in the museum where the intention was to bore a long hole.

Fig. 4 is severely plain in design, but shows a good deal of skill in its almost faultless symmetry of workmanship.

Fig. 5 (17,119). 4-5 diameter.

For the purpose of illustrating working methods, it might be difficult to find anything better than the intended pipe, fig. 5. The piece of soapstone may have been selected because of its suggestive shape, or merely on account of the fact that it was soapstone. Judging from the results of attempts to flake on the under side of this stone, the workman resolved to flake no more. He found his inability to regulate the size of his chips, and came perilously near ruining his material. He has done some sawing, therefore, to regulate the extent of the flakes, or, it may have been with the intention of carrying on this operation until such a portion as that which projects in front of the bowl was completely severed, or so nearly so, that it might be broken off with safety.

Having laid out the shape he meant his pipe to be, he feared to

strike hard or heavy blows to remove the superfluous material on the upper side of the stem, and there he has notched the stone closely by filing with flint flakes, and then knocking off the weakened portions. The lower edge of the knob in front has been similarly treated.

On the side shown in the engraving several blows have been struck with a some what dull-edged stone axe, perhaps by way of testing the hardness of the stone before doing further work on it.

This specimen came from the Crawford farm, near Penetanguishene, and was presented to us by Mr. T. F. Milne, as part of the Milne collection.

Finished Stone Pipes.

During the past season, the museum acquired a collection made by Mr. W. M. Dick, of Brantford, near the boundary between Brantford and Onondaga townships. From numerous graves on lot 10, concession 3, Onondaga, a considerable number of clay and stone pipes was obtained, and some of the latter are here figured. Of both kinds there is a considerable variety, and many of them represent animal forms wholly or in part.

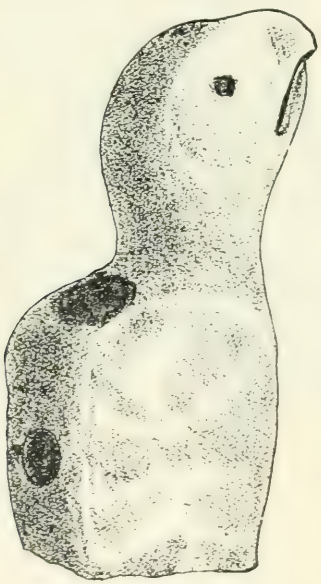


Fig. 6 (25,572). ⅔ diameter.

Figure 6 is made from gypsum and represents a bird form. The bowl-hole is small when compared with the size of the pipe, and the stem-hole slopes upwards to meet it. The whole surface of this pipe has been well polished, but the side not shown in the engraving is somewhat weathered. There is another unfinished pipe in the museum made of this kind of stone.

Perhaps the creature intended to be represented on figure 7 is a lizard, but in support of this supposition there are only the elongated body and tail, and the whole may be merely a conventionalized form. The material is steatite of very poor quality, and so far as the workmanship is concerned there is nothing to indicate the use of any but primitive tools. The bowl is a flattened oval, the cavity of which is as smoothly finished as is the outer surface.

Numerous articles of white man's make were found associated with the stone specimens in these Onondaga graves, but unfortunately we now have no means of knowing whether the graves were all of one period, or of different periods, or whether each grave or only some of the graves contained objects of European origin.

Other pipes from the same burial places are illustrated by figures 8, 9 and 10, all of which bear marks that are usually regarded as evidences of European contact. These are of a soft white stone, scarcely

any harder than the indurated clay found near this city and used in the manufacture of coarse terra-cotta work. The origin of this material has long been a source of wonder to some of us, and I have for some time been inclined to regard it as stalagmitic.

Figure 8 has the longest stem of any stone pipe in our possession, its length being eight and a half inches, only about half of which is shown in the engraving. The sectional drawing shows the quadrangular shape of the bowl as seen from above.

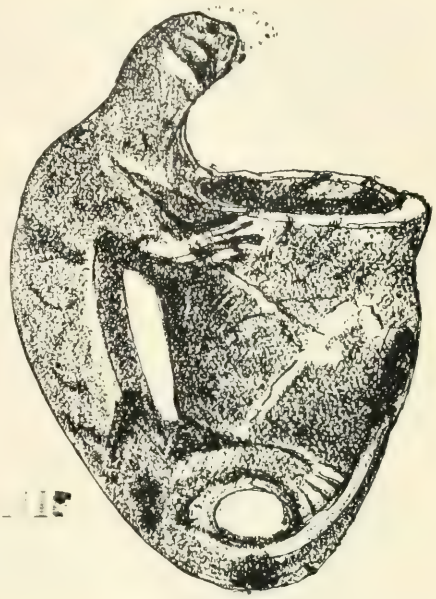


Fig. 7 (25,579). Full size.

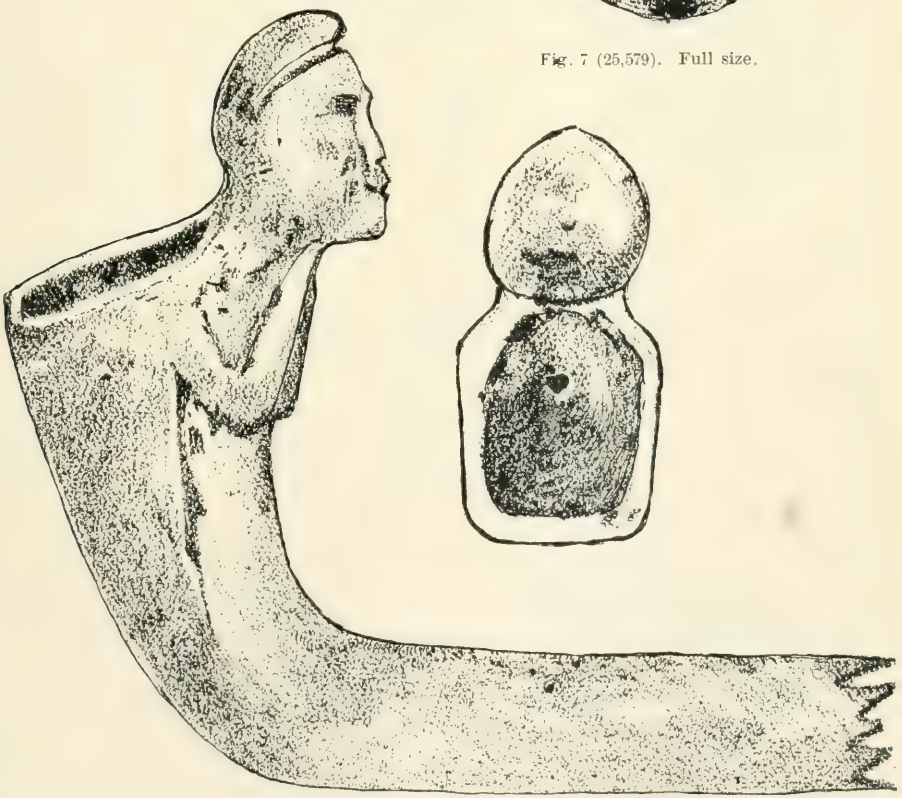


Fig. 8 (25,554). Full size.

Only the head and arms of the carving on this pipe have any human resemblance, and the latter are in a very unusual position, resting upon, or being pressed against the breast. Perhaps the intention was to make the head look as if being supported by the hands, but no hands are shown. The softness of the material may account for their disappearance, had they ever been represented.

Fig. 9 (25,578). Full size.

One seems to see more of the European in figure 9 than in the preceding example. To some extent this may be owing to the headdress, but a closer examination of the workmanship points to a style of art that is not Indian. This is most clearly observable when a full-face view is taken. Looked at in this way, too, it can be seen that although the workmanship may have been performed subject to white man's influence the representation is undoubtedly that of some Indian, for, surrounding each eye is a circular arrangement of small dots extending from nose to ear, and from the middle of the forehead to the middle of the cheek, in outline, which, in all probability corresponds to the fashion of face-painting adopted by the owner of the pipe.

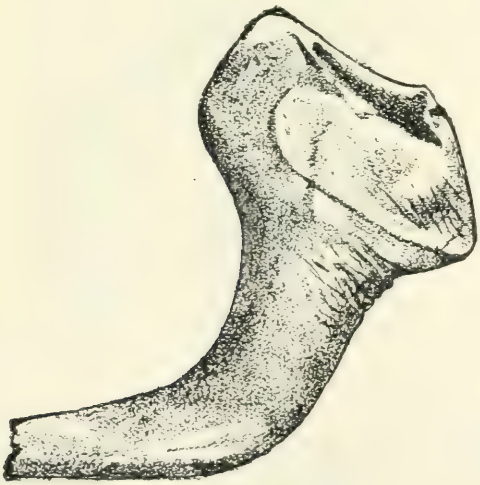


Fig. 10 (25,570). Full Size.

In figure 10 we see what has represented a bird of some kind. Little more than the wing shown on the engrav-

ing remains to testify to the maker's design, unless it be a few lines indicating feathers at the extremity of each wing. Imperfect as this specimen is, it would appear to intimate an art ideal somewhat beyond the Indians. In this specimen the stem is unusually short.

Of a very different style is the stone (figure 11) found at Lion's Head, Isthmus Bay, North Bruce. One is often at a loss to identify the kind of bird, or other animal which we see attempts to portray, but in this case it would appear safe to say, "This is an owl." The stone is slate, for the greater part, of a dark rich brown, but on the opposite side from that shown in the picture, a little more than the wing is of a pale, dull green. The workmanship is excellent, and the proportions are very good. The eye holes are bored fully an eighth of an inch in depth—deep enough to form a good seat for the insertion of any other substance to give expression as eyes to the figure, if any such intention existed in the mind of the maker. The end of the tail has either not been finished, or, if finished has been broken off, as it is still in the rough. In most pipes of this kind a hole is bored crosswise, through the feet, but sometimes perpendicularly, between them. A good example of the latter method is found in an owl pipe very much like this one, and which was found in Tiny township. It forms part of the Laidlaw collection. In figure 11, however, we have a compromise hole, the boring having been done perpendicularly from below half way through the projection that forms the feet, and another hole to meet it is bored from the side not shown in the cut. A little below the breast is a well-made line of serrations, the purpose of which is not very evident. The surface of figure 11 is not as highly polished as the surfaces of many stone pipes are, so that the scratches of the rubbing stone are still in evidence, and the word "rubbing-stone" is used advisedly, for the reason that only one stone moved over another is capable of leaving such results as are apparent on the surface of this pipe, and this is the more remarkable on account of the fact that there are those who claim pipes of such patterns to be of unmistakable European origin, directly or indirectly.

Fig. 11 (25,098) $^{2}/_{3}$ diameter.

Notwithstanding the generally bold artistic way in which figure 11 has been worked out, there is not a single feature of it bearing witness to the use of any but primitive appliances.

One of the prettiest little bits of primitive handicraft that we have in the museum a soapstone pipe, figure 12 (26,604), recently received from Dr. T. W. Beeman. It was found near Dalhousie Lake, Dalhousie township, Lanark county.

Small as this pipe is, the bowl is more capacious than many are of more bulky appearance, as the cavity is seven-eighths of an inch deep, and averages a little more than three-fourths of an inch in diameter. The wall of the bowl has been worked out to such a degree of thinness that portions of it are translucent. The stem-hole is very large—quite three-sixteenths of an inch in diameter. Although drill marks may be traced on the inner side of the bowl, some scooping must have been done afterwards, as the hole is not quite round.

Fig. 12 (26,604). Full size.

Clay Pipes.

Fig. 13, (11,179). Full size.

Fig. 14, (11,391). Full size.

Figure 13 is of a pipe which ranks among the oddities of Tobacco Nation pipe-makers' workmanship. The craned neck, the simply conventionalized face, and the arrangement of lines and dots—all are unique in their combination on this specimen, while its general appearance is much more graceful than the illustration indicates. As is common, the head faces the stem, a somewhat strange notion on the part of a pipe-maker, who, as some assert, was imitating, or was influenced by European examples.

To Messrs. William and David Melville, of Creemore in Nottawasaga township, we are indebted for this excellent specimen.

Perhaps the pipe bowl here figured (fig. 14) deserves notice on account of its originality in design, if it be not too pretentious to speak thus of what seems to be merely an imitation of an exceedingly coarse and knobby branch. The man who made it must have been an "impressionist," among the Petuns, for, beyond simply trying to

show that he could make something, he has put forth no effort to bring out details, or to give his work any finishing touches.

The raw material is tempered with burnt granite or gneiss, as is shown by the particles of quartz, feldspar and mica that appear on the surface, the two former only where there is a fracture.

This pipe formed part of the collection procured from the estate of the late Rev. J. W. Annis, who gathered nearly all his specimens in the northern part of the county of Simcoe.

For comparison with other clay pipes as to style and quality of work figure 15 is a very good example, as the surface has been stained a bright red, the whole of the forehead being yet so colored. The modelling is of the simplest kind, and yet the face is not without expression, which is mainly attributable to the peculiar way by means of which the mouth and eyes are imitated. Several examples of this device have been found in this province. By the method in question a slight depression is made with a bluntly pointed tool, so as to suggest in the one case lips, and the other eyelids. Unfortunately, the cheeks are so much injured that it is impossible to say whether this head was provided with ears. In one specimen, somewhat similar to this, there is not only a poor attempt to imitate ears, but there are holes at the lower ends as if to show where eardrops should hang.

Fig. 15 (17,135). Full size.

This pipe was found at Price's Corners, Medonte township, North Simcoe, and presented by Mr. T. F. Milne.

Stone Axes.

A large number of the stone axes and adzes we find are very roughly made, as if meant merely for work, without any desire on the part of the maker to produce a good or well-finished tool. In some instances it is plain that efforts have been put forth to show the old mechanic's taste and skill, and figure 16 pictures what is the most highly polished object of this kind in the museum. It comes from Elgin county, in the old country of the Neutrals, and from which many objects of unusually excellent workmanship have been procured. The material is of primary rock, very hard, and of a greenish gray color, mottled with spots of a darker shade.

It is astonishing how the belief has spread so currently in this province that all such specimens were used as "skinning stones." Next to arrowheads they are, among Indian relics, by far the most common, and it is absurd to believe that they were employed as the

popular name suggests. They vary in size from two to thirteen or fourteen inches in length, and in weight from a few ounces to five pounds. It is therefore, evident that neither the very small nor the very large ones could have been used as skinning tools, and it would seem somewhat difficult to draw the line respecting those that are supposed to have been so employed. There is no doubt at all that a handy stone, of the kind in question, may be used effectively in removing a hide from a slaughtered beast, but so may many other stone objects, and so also may not a few that are made of bone. Butchers find their knife handles answer very well when the strong adherences have been cut with the blades, but it is quite impossible to give any stone tool of this kind as good a cutting edge as is possible on a piece of flint or chert, and nothing can be more certain than that implements of the latter material were the true skinning stones. Indeed it is most probable that any arrowhead available was so employed when the occasion demanded.

Fig. 16 (D.897). Full size

We have, in the museum, three tools from the New Hebrides, of the same type as those that are so abundant in Ontario and other parts of the world, and fortunately, these are connected with handles just as they are used at the present day by the natives of the islands named. Two of them are fastened adze-wise to handles which are respectively eighteen and twenty inches long, with an elbow, and the third is inserted in a cleft at the end of a haft three feet in

length. The latter is of symmetrical form; that is, both sides are equally rounded, but the former two are comparatively flat on one side and well rounded on the other, and it is the rounded side that fits against the handle, or which is the nearer to the workman when the tool is in use .

the world, is so great that if by any means a number of representative specimens should become mixed, it would be a matter of no small difficulty—indeed, almost an impossibility, to assort them properly.

It may not be out of place to repeat here that throughout Europe specimens of this kind are yet found, and are known as Thunder Stones, the popular belief being that they have fallen from the sky as thunder bolts. Perhaps it is for this reason that we all use the word "bolts" when we speak of a lightning flash, especially when anything is "struck."*

Slate Knives.

Slate has always been a favorite material with the Indians of Ontario for the making of certain kinds of tools and of what, in our ignorance, we call "ceremonial" objects. Occasionally we even find an axe or a gouge shaped from it. Tools known as women's knives are invariably made from slate. These are mainly of two patterns, semi-circular, or crescent; and sagittate or arrow shaped. Eskimo women still use tools of the former pattern in the cleaning of fish, and in the dressing of skins. The largest specimen we have of the half-round type, about nine inches long and fully half as wide, was found on the banks of the Madawaska river, and was presented by Mr. Archibald Riddell, of Arnprior. The figures accompanying this

Fig. 17 (17,142). Slightly reduced.

*Since this was written, Prof. J. Walter Fewkes, of the Smithsonian Institution, has kindly sent me a copy of his Preliminary Report on an Archæological Trip to the West Indies, from which it appears that the Porto Ricans (mainly of Spanish origin) have inherited this old world notion.

On page 116, Prof. Fewkes says: "The celts are called by the country peope 'thunder-stones' since they are believed to have fallen from the sky. Almost every household has one or more of these stones, which are thought to afford protection from lightning, or to be efficacious in the treatment of certain bodily disorders. The method employed by the natives to determine whether a stone is a "thunder-stone' is to tie a string around it, and put it in the flame of a candle. If the string burns immediately, the stone is not regarded as a true 'thunder-stone.'."

note represent the smallest of their kind in the museum. To most implements of this sort, it is probable that some kind of handle or haft was attached, as we know the Eskimo do with theirs. Figure 17, which is straight-backed, is thinned along that edge as if to allow of the blade being let into a slot in a piece of wood, and figure 18 is quite rough along the corresponding edge as if it, too, was meant to be covered with some sort of handle, unless we regard the specimen as an unfinished one.

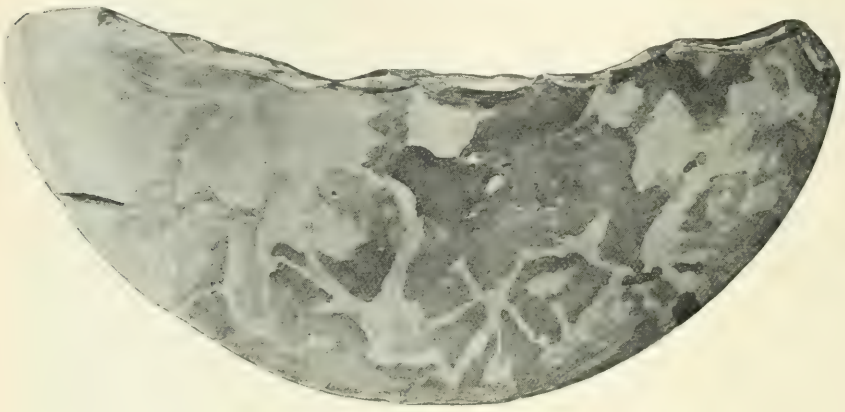


Fig. 18 (3,760). Slightly reduced.

Our largest specimen, already mentioned, is so made as to leave the back considerably thicker than the blade, the division being marked off with a decided shoulder, and this thick back may have answered the purpose of a handle.

Another slate knife, but obviously deriving its form from that of the arrowhead is illustrated by means of figure 19, which was found at Rylestone, near the north-east corner of Northumberland County, and presented by Mr. D. Allan. It will be observed that this specimen is not symmetrical, but this is probably accidental rather than intentional, or it may be the result of wear, although we have several examples of small knives showing a decided purpose to make one side rounder than the other, and a few that seem to be intermediate in relation to the half-round and arrow-shaped forms, in which only one side has been brought to a cutting edge.

Before the days of specialization, an arrow-head may have served also as a knife, a scraper, a saw, and a drill. At any rate, the various chipped cherts we regard as having been so used seem to carry with them proof to this effect. Figure 20, from the County of Middlesex, Ontario, is (reputedly) a woman's knife in an unfinished state, as the edges are not sharpened, nor is the work on the shank completed.

Smaller specimens of this type are more common, and some have been figured in former reports. In more than thirty examples the edges are, without exception, more or less convex, differing in this respect from figure 20.

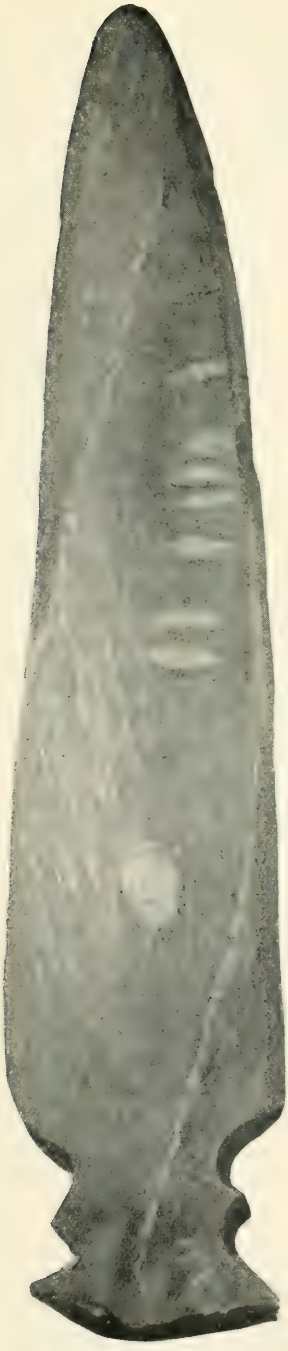


Fig. 19 (3,769). Full size.

Fig. 20 (3,778). Full size.

A Slate Pendant.

Of slate also, but for a totally different use is the object figured at 21. It was found at White's farm, South Yarmouth township, county of Elgin, and belongs to the class of object known as "pendants," and as the hole shows considerable signs of wear, the specimen may have been so worn, either by itself, or, as part of a necklace. For all we know it may have been attached to a waist-belt, or have been a portion of dance toggery worn at the knee, or it may have possessed some talismanic reputation as part of a medicine man's outfit; we know not. The probability is that such articles were used as personal decorations in some way, and the ancient workman has apparently taken pains to shape this particular pendant in some conformity with the veining of his raw material, a piece of Huronian slate. When perforated slate specimens, from two to four inches long, come to a point at the lower end, there in good reason to regard them as having been eardrops On more than one occasion I have found them in Iroquoian, or Huron-Iroquoian graves, so situated in relation to the skull as to make this probable. An excellent pair was found in a mound on Mr. C. A. See's property, on Tidd's Island, River St. Lawrence, some years ago, and we have added others since.

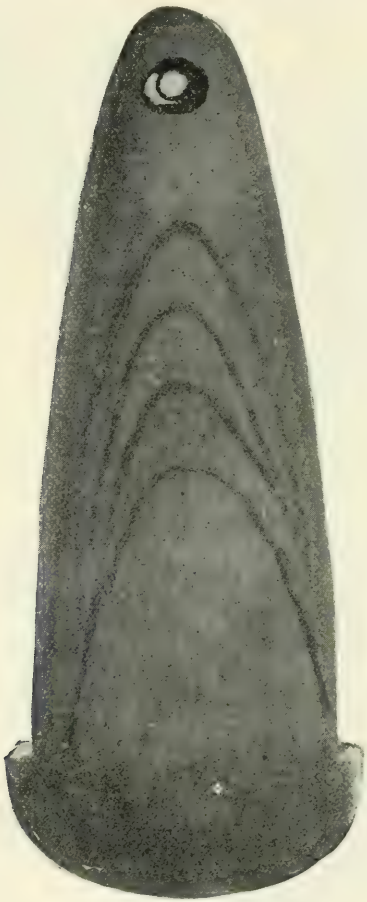


Fig. 21 (458). Full size.

The pendant character of figure 21 may be assumed, not only on account of the hole, but from the fact, that while the maker has been at great pains to obliterate almost every trace of roughness on one side, the other side is much less carefully finished.

It may be noticed here that many more objects made from this striped slate are found in the south-western than in the eastern part of the province.

Stone Gouges.

Few stone tools attract more attention than is given to gouges, and when all has been said, it cannot be claimed that we know much about them. I have no recollection of anything like them being reported outside of North America, and even here they are mainly, if

not wholly, found in the valley of the St. Lawrence. Not many of these tools show any evidence that they were used otherwise than directly in the hand, although most of them are made much like the stone axes and adzes, and might have been similarly attached to handles. We have at least two specimens, however, respecting which there cannot be a doubt as to their having had handles, or how these handles were fastened to them; and a few others bear marks that may also have been made in connection with some attachment of this kind.

Fig. 22 (19,831). ¾ diameter.

Of about a hundred and fifty in the museum, two-thirds come from the Rideau Valley, in the greater valley of the Ottawa, and most of these differ in form from those found in the western part of old Ontario; the lips, or cutting edges of the former being flatter, and the sides somewhat shouldered as compared with more deeply and widely rounded hollows of western forms. Figure 22 illustrates one of the eastern type found near Lake Temagaming. It is of argillite, as many gouges are, besides having the characteristic shallow and shouldered lip, is sharpened at the opposite end like an axe.

This quite uncommon form was found near Temagaming Lake in Nipissing District, and came to us through Mr. Aubrey White, Deputy Commissioner of Crown Lands.

The one shown by figure 23 is much smaller, and, in some respects, more accurately worked. It is from a section that has yielded nothing of the kind previously, and is interesting for this reason. For it we are indebted to Mr. Frederick Birch, of Wodehouse. The portion of the face above the hollow is quite flat, while the back is rounded; this, added to the fact that the head has been left rough, suggests that the tool was not used directly in the hand.

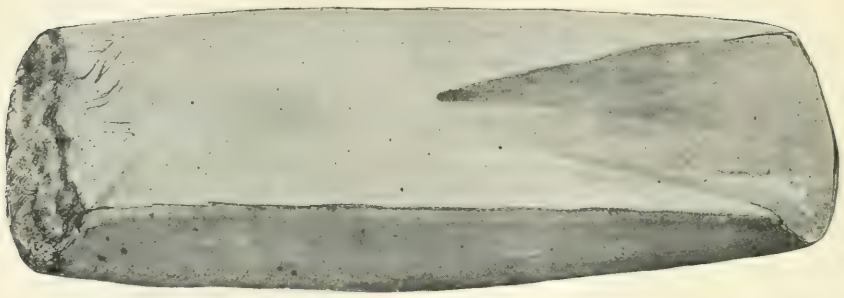


Fig. 23 (26,151). Full size.

Figure 24 illustrates the smallest gouge in the museum, but the engraving does not well bring out the hollow which extends from end to end of the specimen. The edge is ground to a chisel point. This very small tool comes from near Port Maitland, in Haldimand county.

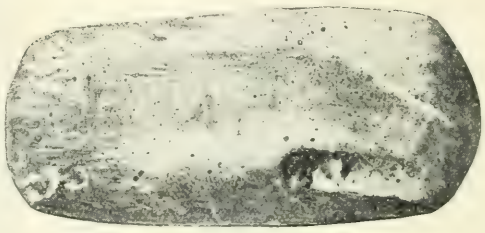


Fig. 24 (17,204). Full size.

Fig. 25 (5,088). Full size.

The tool (5,088), of which figure 25 is a diagram, was found by Mr. A. McCoy, in Drummond township, Lanark county, and is of the eastern Ontario type, but much flatter than most tools of this kind are. Indeed, it is nothing more than a small slab of slate, roughly rounded on the two long edges, and very slightly hollowed to form a cutting lip. Some of the scratches on the side shown are of recent origin, perhaps the result of using the stone as a hone, but the star-like arrangement of lines at the upper end, although seemingly much older, still have a modern appearance, the accuracy with which they are made indicating the use of a ruler or straight edge on the part of the man who made them.

The only use that suggests itself in connection with tools of this kind is, that of removing the charred wood from the inside

of dug-out canoes, or for a similar purpose in the making of wooden bowls. For the former use, a tool like figure 22 would answer very well, while one like figure 23 would serve admirably even when held directly in the hand, for the cutting away of charcoal from any small wooden vessel in process of making.

Nobody has yet suggested or insisted that the Indian never thought of such a tool until he had seen one in the hands of a French carpenter, but there is yet time to show how utterly foreign the curved lip, and the whole idea of *gouging* are to the aboriginal imagination. It may readily be proved that half-round steel files were absolutely necessary to form the hollow!

Figure 26 is of a somewhat peculiar specimen on account of its having been degraded, or subjected to a secondary treatment, by which means a large portion of the hollow has been ground away not only at the lip, but for fully two inches back, as the cut shows. In its present form it was no doubt a very effective cutting tool, when attached to a handle, as the pecked hollow on the rounded side shows to have been the case. The gouge was found at McDonald's Corners, on Rideau Lake, by Mr. W. Dunlop, from whom it came to the Provincial Museum per Dr. T. W. Beeman, of Perth.

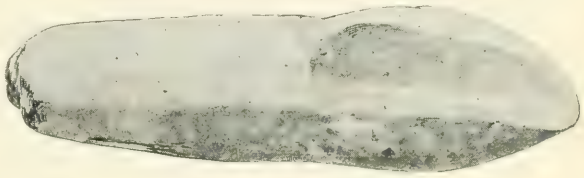


Fig. 26 (5,067). Half diameter.

Pebble Gorget.

Figures 27 and 28 are cuts of a somewhat peculiar piece of Indian work, found near Clarksburg, Collingwood township, county of Grey, and comes to us from Mr. Frederick Birch, of Wodehouse. It belongs to the class we call gorgets, although we are yet without any satisfactory reasons for so naming them. As has more than once been mentioned in our reports there was no regulation pattern for them—in a general way, they resemble one another, but the size and form were regulated mainly by the possibilities of the bit of slate or other stone in the workman's hands; indeed, it may be said that the shape of almost every primitive artifact is, to some extent, the result of such a condition. It has frequently been observed that the savage was not at all slow in perceiving how the natural shape of a stone might be

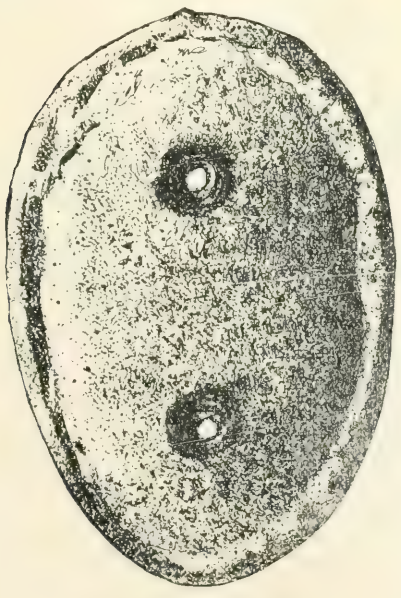


Fig. 27 (26,578). Full size.

utilized, and every museum contains examples of various kinds of tools and other articles, the idea of making which has been suggested in this way.

Figure 27 (26,578) is a very good example of this kind. Notwithstanding much that is artificial-looking about this specimen, besides the holes, it is of purely adventitious form. A well marked collar or flange borders the stone, as may be seen by figure 28, which shows a cross-section. The holes are deeply countersunk, on each side.

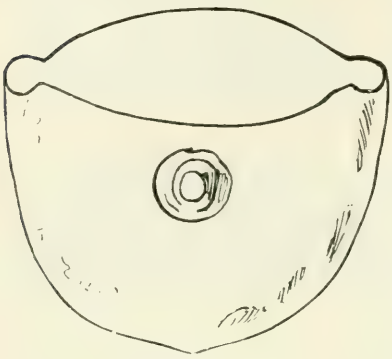


Fig. 28 (26,578).

How the Indian Mended Stone.

Figures 29 and 30 illustrate very clearly an aboriginal device for holding together parts of what we may suppose to have been valuable articles.

In figure 29 one of the holes seems to go through the crack in the specimen, but this is only in appearance, as the fracture extends oblipuely to the left, almost to the edge ofthe other hole on the opposite side.

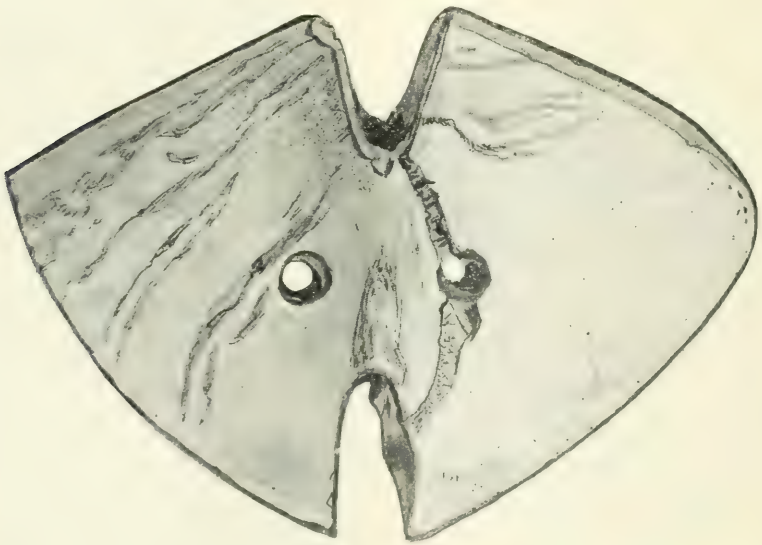


Fig. 29 (2,004).

We may surmise that the portions were bound together by menas of a thong, probably of rawhide in a moist condition, so that when it dried the parts were drawn tightly together.

Be this as it may, the holes were for repairing or fastening purposes, just as is sometimes exemplified on pottery. Figures 29 and 30 have been chosen for illustration, because, so far as records show, there is not a single early reference in print to such objects which, perhaps, pertained to people preceding those we know anything about.

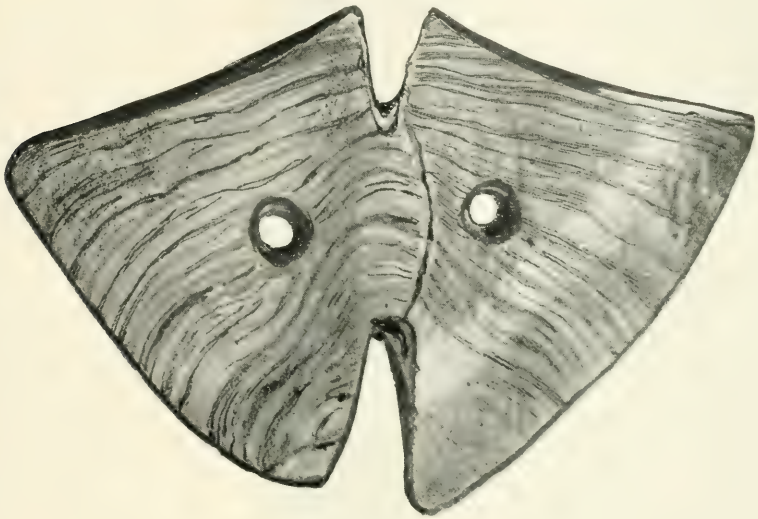


Fig. 30 (12,803).

STONE FILES OR STEEL FILES.

In much that has recently been written with respect to European influence upon Indian handiwork, a good deal of dependence has been placed upon what were regarded as undoubted proofs that steel files and drills were used. Mainly, or largely on this supposition, the claim is maintained that numerous objects of good, bad and indifferent workmanship, hitherto assigned to purely Indian origin are nothing of the sort. As this matter is referred to elsewhere, in the present report, the purpose here is merely to examine briefly from a mechanic's point of view, what truth there is in so-called steel file evidence, as this is found on stone pipes and other articles usually called "Indian."

It is taken for granted by those who discover so much that has been produced by means of white man's appliances, that the deeply cut rings seen in stone borings, and the parallel striæ observed on polished surfaces of stone are necessarily the result of steel tools having been employed. Confessedly, at first sight, such reasoning would appear to be correct, but in practice the results do not correspond with this conclusion, for it is quite easy to get from a steel file on a smooth surface, lines or scratches which are not at all parallel, and it is equally possible to produce tolerably parallel lines by the use of a stone file.

Fig. 31. [Enlarged.]

Every mechanic who has been taught to use a file properly, knows how difficult it is to overcome tendencies to the rocking and wobbling of his instrument—motions that give very unsatisfactory results and tend to leave very confused striæ; whereas the steady motion of a gritty stone over the surface of a softer one will produce scratches with a parallelism that is surprising until one begins to reason the matter thus: The most effective points in a stone file are the hardest and highest, or most prominent particles, which are usually of siliceous character, and these, although occurring irregularly, produce marks quite straight and parallel, although not so sharp or so deep as if made with a steel tool, because grains or particles often break down before the stroke, or push, or pull is completed, and as other grains are thus brought into play, the striæ are also less distinctly continuous.

During the last twenty or twenty-five years I have, at intervals, and as opportunity served or required, made experiments with metallic and mineral files

on limestone, slate and soapstone, the kinds of material from which the Indian produced nearly all his finer specimens of work—that which, it is now claimed, he could not have accomplished without direct or indirect European aid, and I have found that when looking over the experimental pieces after the lapse of a few months, and when I had forgotten which was which, it was often difficult, if not impossible, to distinguish those that had been treated with a Sheffield "Sorby" from those that had been rubbed, stone on stone.

For this and other reasons it was thought desirable for the present report to take another piece of stone and do similar work on it anew. For this purpose a bit of hard, dark-grey, fossiliferous (probably Trenton) limestone was chosen, partly on account of its shape, from a heap of building material lying on the Education Department grounds. The rougher prominences were reduced with the assistance of a grindstone. With a fairly good file, borrowed from our carpenter, the results were as they appear at the top of figure 31. On the two lower portions a piece of coarse red sandstone was used.

The marks resulting from the steel tool are undoubtedly deeper, sharper, and more continuously parallel than are those made by the stone tool, but the statement is here ventured that the general appearance of the surface marked by the stone tool, especially in the middle portion of the limestone, so strongly resembles the work of the steel file as almost "to deceive the very elect."

The results from a new file are not so good as those from one somewhat worn, because the most delicate points of the hard metal break when brought into contact with the stone much more readily than if rubbed over iron, and the results are more like the work of the sandstone tool on the middle and lower parts of the limestone in the figure.

Some Mechanical Methods.

There seems to be a disposition of late, on the part of certain American archæologists, to regard the prehistoric Indian as a being of extremely low intelligence—only a few degrees, indeed, superior to some of the lower animals. It is conceded that he lived, and that he was exceedingly cruel, that he delighted in war, that in a very crude way he managed to produce a few weapons and utensils, but really was of little or no account as an artificer until after he came into contact with white men. By implication it is taught that not only was warfare chronic, but that every man engaged in it; that for a change he did something by way of hunting and fishing, simply that he might live; and that grossly superstitious as he was —as all savages are, and many who are not, even now—he lived the lowest kind of life, without inventiveness, or other kind of originality, and was utterly deficient in art instinct.

Ethnologically, however, we learn that he was a tolerably high type of savage. He possessed a considerable share of imagination—he peopled his universe with good and bad spirits, as well as with a multitude that were neither one nor the other—he attributed reason to everything having animal life—he feasted and gambled for divination purposes, if not for those of a worshipful kind—he loved

finery—was given to bravado, and fond of story-telling—liked to make speeches—was extremely hospitable, and lived up to his tribal code of honor. From this unembellished statement of fact, it is easily deducible that he *was* somewhat originative, which does not mean that every one was gifted with originality, any more than it would be true to say that every one of our superior selves is so blessed, or cursed, but it does signify that notwithstanding the simplicity of aboriginal tastes, and the rudeness of primitive society conditions, notions were "abroad," and that here and there among the people real novelties arose from time to time. During the historic period we have had numerous notable examples of Indian intelligence in different departments of business life, and it can scarcely be that "no man of parts" appeared during prehistoric times.

Wherever he came from, he brought the knowledge of how to make a stone tomahawk and a stone arrow, we know not how much more; but we do know, that adapting himself to his surroundings he produced many other things that ministered to his wants, and that he was far from being too hide-bound in the matter of custom to refuse the adoption of what was novel, as far at any rate as his limited intelligence would permit, and it is exactly in this relation that even civilized races stand to their environment to-day. It is a question of degree, not of kind. But, in admitting that as a rule his wants were limited in accordance with his ideas, and his ideas in correspondence with his wants, we are not bound to conclude that either mentally or otherwise his condition was stereotyped. The archæology of the Atlantic slope, to mention no other area, points to a very different conclusion, for here we find many samples of workmanship that differ totally from those found in any other part of the continent, or of the world. Some aboriginal genius must have cropped out now and again in æsthetic as well as in mechanic art. Our old savage knew what he wanted to make, and he knew, too, just the kind of material best suited for his purpose. With intelligence far beyond that of the eolithic stage, his eye was quick to seize upon any natural or adventitious form in wood, bone, or stone from which to produce desired results with the least amount of labor, and that his reasoning power exceeded that of paleolithic man, we have evidence to show in every private or public collection.

In figure 32 we have an example of what may be called his adaptiveness. Here was a waterworn pebble with some resemblance to an axe, but it was lacking in symmetry. By means of persistent pecking with sharp and heavy fragments of harder stones the pebble has been reduced to something like the desired shape. The side shown in the illustration required fully twice as much work as the other side did, and consequently the waterworn polish is better exemplified on the opposite surface.

The excellent specimen of which figure 32 is a diagram, was presented to the Provincial Museum by Mr. Hugh Nichol, of Stratford, Ont.

Another of a similar kind is represented by figure 33. For this example of pecking merely to remove a hump from what was also probably meant to be an axe, we are indebted to our very good friend, Dr. T. E. Craig, now of Manchester, but formerly of Law-

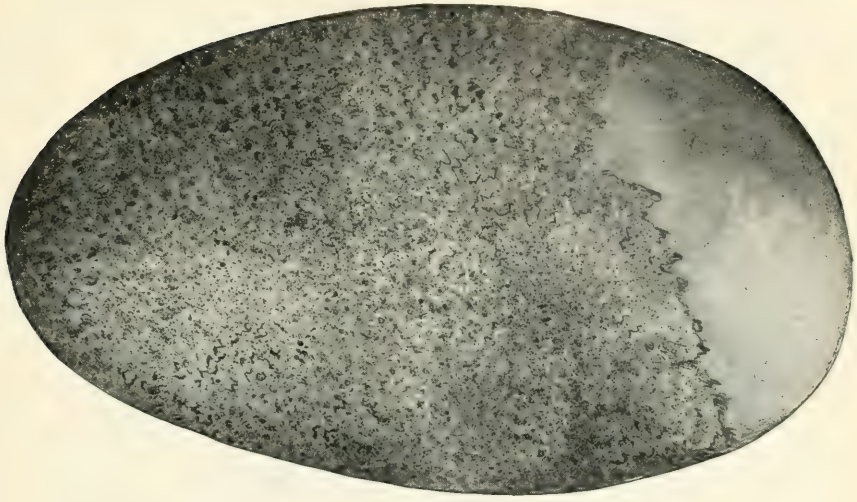


Fig. 32 (5,438). $\frac{3}{4}$ diameter.

renceburg, Indiana, near which city the original of figure 33 was found.

In figure 34 we have an illustration of another way in which reduction in size was effected. The stone was first slightly pitted on each side, near the middle, so as to be easily grasped between the thumb and middle finger; sometimes the pitting seems to have been

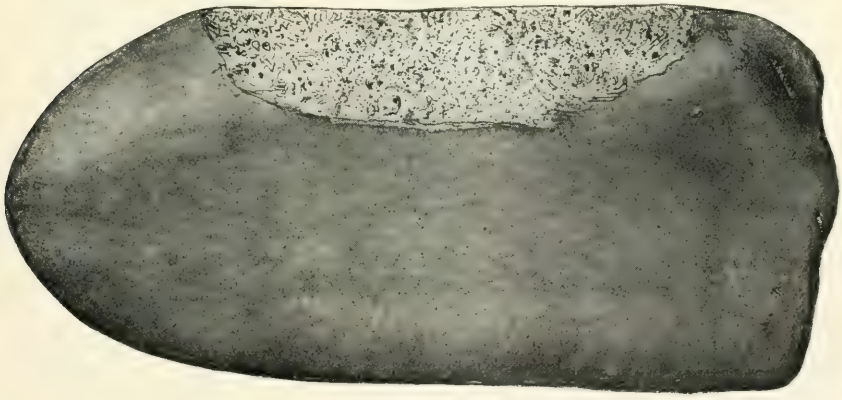


Figure 33 (5,436). $\frac{3}{4}$ diameter.

the result of using the stone first as a chipping block. In either case when it was afterwards used as a hammer the points of percussion would naturally be those which were most prominent. In this way a double purpose was accomplished, as also was the case when the pitting was the result of usage as a block. Some one (probably the late Mr. Frank H. Cushing) has suggested that discoidal stones were thus evolved.

Figure 34 came to us from Pennsylvania, through the U. S. National Museum.

Figure 34. 12,427. ½ diameter.

Figure 33 is drawn a little more than half the diameter of a specimen which is a puzzle in methods. The material is argillite, and the object itself was found near Lombardy, Leeds county, a district that has yielded an unusually large quantity of valuable relics, most of which are now, thanks to Dr. T. W. Beeman, in the Provincial Museum.

Three sides of figure 35 have, one would suppose, been dressed. The one on which it rests, when looked at horizontally with the upper end to the right, is partly polished, while the unpolished portions look as if they had been treated with a saw, but the apparent saw-marks are rather what one would expect to see on wood. Marks of a similar kind, but even more distinct, are seen near the lower end of the diagram. On the shaded part, too, marks of this sort occur, but as the stone is slightly concave here, crosswise, it is quite evident that no tool of the saw kind, whether of stone or of metal, could have been employed; yet it is not easy to account for the regularity of the marks as a result of weathering, especially as they in no wise correspond with the terminations of the layers that characterize argillaceous rock. The likelihood is that the marks are the result of glacial action.

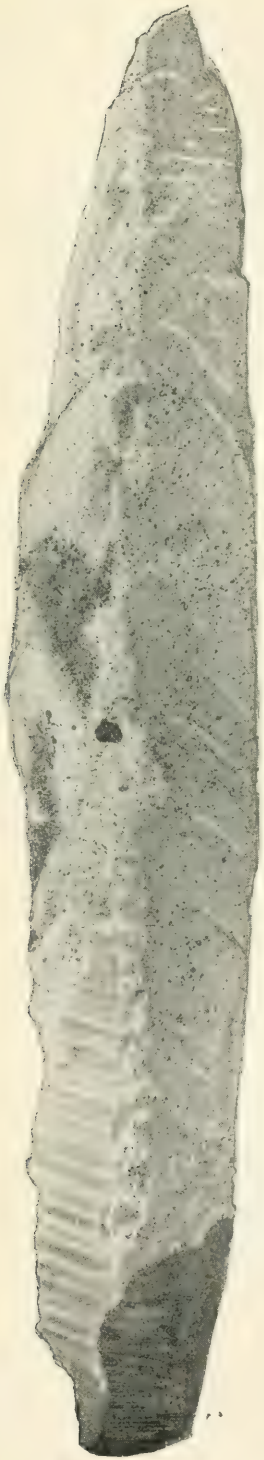


Fig. 35 (5,487). ½ diameter.

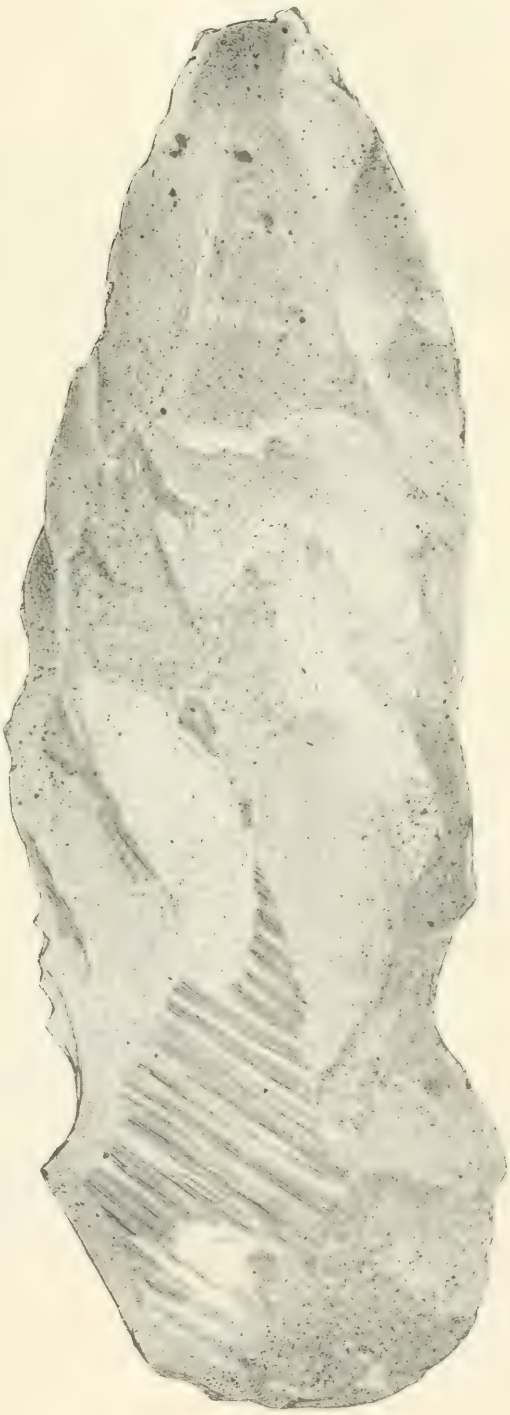


Fig. 36 (5,439). 7-12 diameter.

Evidences of these layers appear in the slightly curved diagonal lines on the right side of the illustration, and should be marked again on the opposite side, not on the side shown to the left.

In cross section this unfinished tool is rhomboidal.

Perhaps the specimen is simply an adventitious splinter of rock, the regularity of whose appearance has suggested the practicability of modifying it into a chisel similar to a few well finished examples we already have in the museum.

The specimen here figured (figure 36) is not only our largest example of chipping in the rough, but is one of the few examples we have of any attempt to make an implement from Utica slate, or shale, a kind of material one would regard as not being at all adapted for such a purpose. In the catalogue entry of this specimen, as recorded Nov. 7th, 1891, are the words "roughly sawn and chipped slate axe," from which it appears that I regarded the diagonal, parallel, and somewhat deeply cut lines as resulting from the use of some sort of saw. I am now quite sure that these were not made in any such way, but are more like glacial striæ, as these may be seen sometimes where there is an outcrop of this formation. For it is noticeable, that soft as slate and limestone are in comparison with granite, diorite and other primary rocks, the ancient ice-marks can often be traced on their surfaces when there is not a vestige on others, or, when, at all events, those on the latter are for less sharply marked. The marks also on pieces like this and figure 35 go to show that the material was taken from some surface exposure.

That the chipping is the result of handiwork there cannot be a doubt, but it is far from easy to surmise what possible use was intended for this tool. Apart from the frangibility of the stone, this piece is very much thinner on one side than on the other, in addition to which its very thinness gives a strong curve to the under side (as the diagram stands) thus rendering it difficult to understand how the finished implement could be put to any effective use. Not a tap has been made on the surface by way of pecking, and there is still some work that might have been done by means of flaking. It is twelve inches long, four inches broad, and averages an inch in thickness.

As a study of early man's workmanship, this specimen is one of the best in the museum. It was found on Rideau Lake, and was presented by Dr. T. W. Beeman.

Another very good example of rough chipping, and that, too, on stone of soft, argillaceous quality, is illustrated by figure 37 from near Carlisle, Ancaster township, in the County of Wentworth. It is not as long as the last described specimen, being only ten inches from end to end, but its width and thickness are respectively four and a half inches, and one and three-eighth inches.

The material lent itself admirably to flaking, and some of the spawls must have been very large; the scar of one measures fully ten square inches.

The style of notching in this specimen as well as in one from Rideau Lake is restricted to Ontario and contiguous territory. Our Indians made the handle-grooves, wide, shallow, and all round the axe, or sometimes merely notched the edges, and almost invariably

used thinner pieces of stone than were chosen by more southern peoples, who grooved two sides and only one edge of their axes, performing the work, too, in a much superior way. It may also be noticed that in the latter the transversely, ungrooved edge is frequently grooved slightly lengthwise, the intention being, as some suppose, to provide a good seat or bed for holding a wedge to tighten the head in its haft.

Fig. 37 (17,255) 3-5 diameter.

The unfinished specimen, two sides of which are here figured full size, (figs. 36 and 37) comes from the township of Humberstone, Welland county, where it was found by Mr. Cyrenius Bearss, to whom the museum is deeply indebted for numerous gifts.

This piece of stone is almost jet black and nearly seven inches long, but of uncertain quality. Edgewise it is a little more than three-fourths of an inch in thickness, the sides being nearly parallel, but one much wider than the other. The remaining sides are irregular in outline. All have been more or less rubbed down to smoothness, most of the work having been done on the parallel sides, and considerably more on the wide side than on the narrow one. Faint traces of parallelism in the striæ appear here and there, but nothing at all suggestive of a steel file.

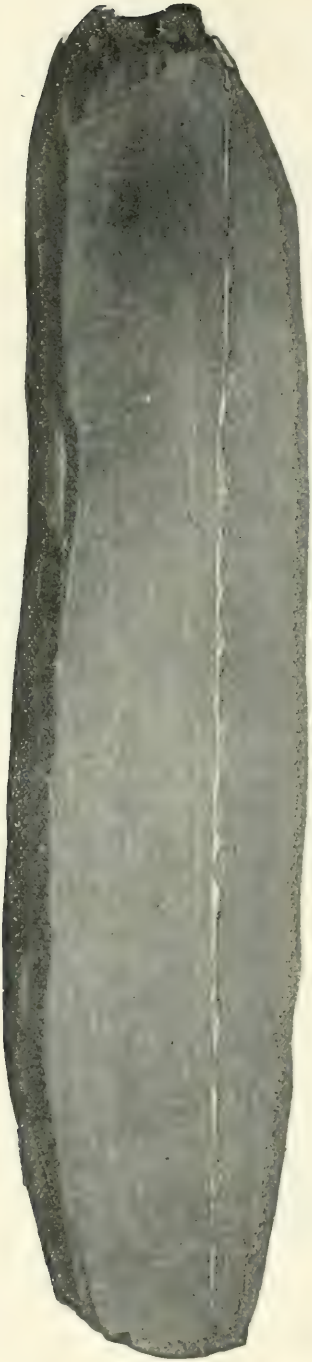


Fig. (38 1,531). Full size.

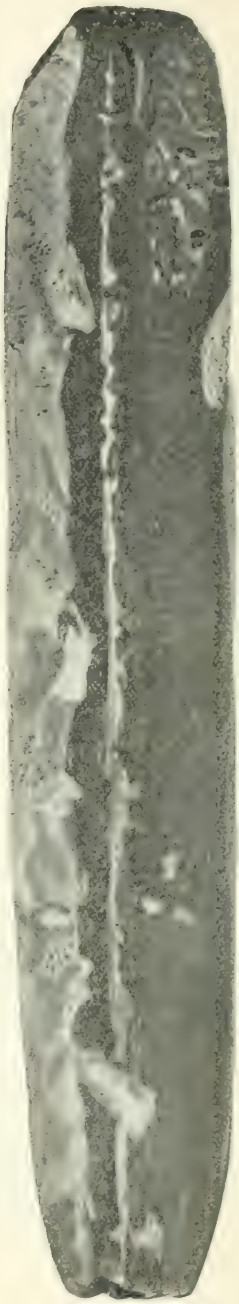


Fig. 39 (1,531). Full size.

It is quite impossible to say just what this stone was intended to be when the work was finished, but whatever the purpose may have been it was thought necessary that the sides should be straight. The one shown by figure 38 is already as nearly so as a plane could produce on a piece of wood. But the most striking feature of this specimen, and the one on account of which any attention is now paid to it, is the presence of a well marked line on each of the parallel and well smoothed sides, for the plain purpose of guiding the workman in bringing his material to the proper shape and size.

On one side (figure 38) the surface is so well rubbed down that traces of the line have almost disappeared, (they are much less distinct than is shown on the engraving) but on the side (figure 39) the line is still measureably deep, in some places not less than a thirty-second of an inch. In accordance with European methods, the workman would have simply scratched a line on the surface, or, desiring it deeper, would have cut it continuously with a sharp chisel, but this line is very roughly pecked, as if done by means of some sharp-pointed tool following a flint saw mark. Now, if an Indian laid out his work even in this simple way, it indicates the application of mechanical methods where we have been led to believe that only the "rule of thumb" prevailed.

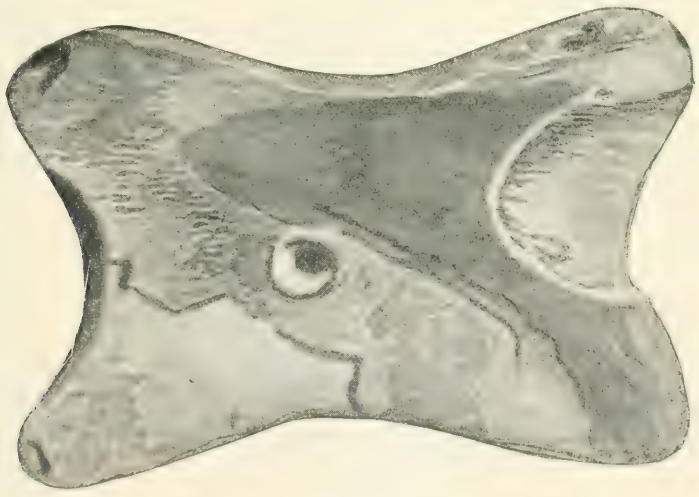


Fig. 40 (5,133). Full size.

We are as much as ever in the dark regarding the use of such tablets as figure 40, and which, by a tacit understanding have come to be known as "gorgets." In this province, nine-tenths or even a larger proportion of them, are made of slate, and as has been remarked on some former occasions, no two are formed alike. Among some hundreds we have only another specimen with four concave edges. It is not, however, on account of its shape that it has been chosen for illustration, but because of the condition in which the surface is, as a result of accidental flaking. Its appearance conveys the impression that during the boring process large pieces had scaled off, in consequence of which, the workman rejected it as being too

thin for his purpose. In an ordinary case, the stone might have been rubbed down into shape but on account of a twist in the material, such an operation could not have been successfully carried out, and the workman evidently discarded the piece altogether.

No attempt whatever has been made to bore from the opposite side, which has been rubbed, but not polished, as many gorgets are.

Parallel striæ, on hollow parts of the fracture evidently made before it was determined to throw up the job, follow undulations in a way that by no possibility could have resulted from the use of a file.*

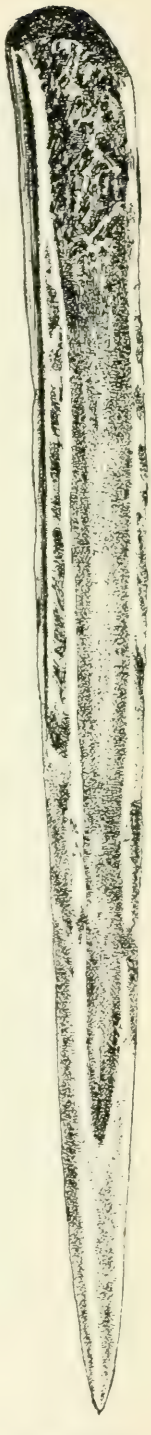


Fig. 41 (25,155) $\frac{2}{3}$ diameter.

Bone and Horn.

The largest bone awl in the museum is represented by fig. 41. It was found in the county of Ontario, by Mr. H. Pascoe, measures eleven and a half inches in length, and is well proportioned. Probably it was made from the leg bone of a deer, from which the piece has been sawn.

Tools of this kind must have been used in heavy work, such as perforating sheets of bark for wigwams, canoes and buckets. It is not at all unlikely that there were other uses to which these so-called awls, or needles were applied, more especially the smaller ones. They may have been used as pins, or skewers, either for fastening clothing to the body, for keeping open or shut what served as doors to the skin and bark wigwams, or the women may have employed them in making the necessary attachments for carrying their papooses.

In former reports, specimens of the smaller kinds have been described and figured, of ornamental shapes, and bearing incised, decorative patterns.

A very fine specimen, only an inch shorter than fig. 41, and highly ornamented with straight lines, was found on lot 5, west half of concession 2, township of Bexley, and is in the Laidlaw collection.

* "Amongst the earth which we cleared out of this chamber we found quantities of ivory, fragments of circular boxes, limbs, the hoof of a bull on a pedastel, fragments of utensils, and *tablets with holes through them*, probably for suspension."

From an article by J. Theodore Bent, in the *London Athenæum*, for July 6, 1889 on The Mounds of Bahrein. (The Bahrein Island form a small group off the Arabian Coast, in the Persian Gulf). Similar tablets are found in Great Britain.

Fig. 42 is not a very good drawing of what appears to be an abortive form of antler, the hole in which suggests that it was intended to be what is called an arrow-straightener, that is, a kind of "pinch" through which the shaft was pushed until it came to a bent or curved place, when the tool was used lever-like to bring it into line. Something of the same kind now, or until recently, used by some Indians in California lends color to the probability of this theory.

Perhaps the aboriginal eye caught the peculiarities of this antler—peculiarities that do not come out well in the cut, for it seems to have grown in an odd sort of independent way from the base of the main antler, a portion of which may yet be seen on the side of the specimen not shown in the diagram.

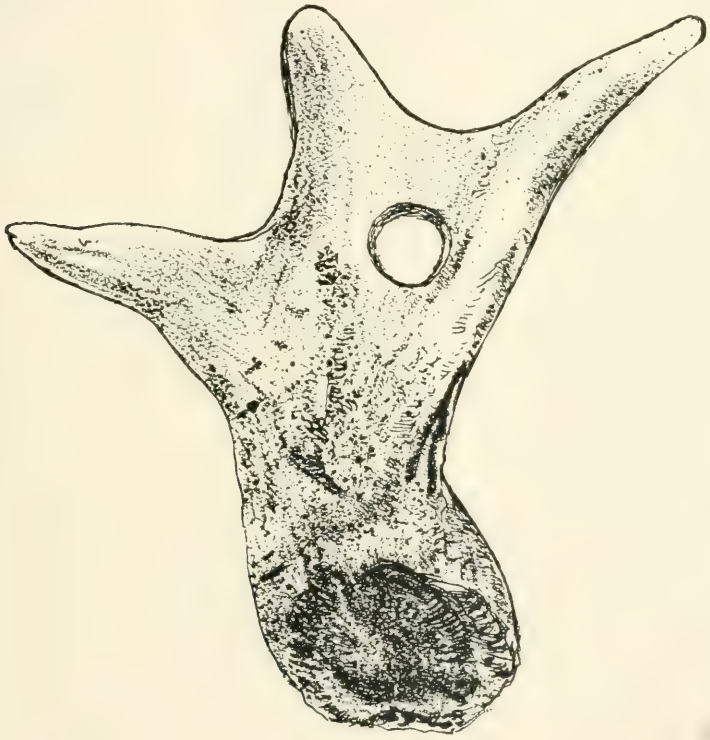


Fig. 42 (25,511). Full size.

The holes in such specimens are generally at an angle, perhaps as a result of the way in which the tool was used, the pressure and consequent friction wearing away two diagonally opposite sides—one above and one below. As this tool does not possess the peculiarity in question, perhaps it had not been much used. It is from the Miller farm, Onondaga township.

The phalangeal bone here figured is from the Purdy farm, lot 5, concession 3, Brantford township. Bones of this kind, probably of the common deer, are frequently found in ash-heaps connected with old village sites. Occasionally they show no signs whatever of

workmanship, but in other cases burnt marks appear on the ridge of the rounded or front surface. Marks so made are simply short bars extending crosswise, and vary in number from one to five or six, leading to the supposition that the bones were used in some kind of game—perhaps shaken and thrown as dice, or in some such was as the peach-stone or plum-stone game is now played among the Iroquois, namely, in a shallow wooden bowl as is described on pp. 126-8 in the Ontario Archæological Report for 1898.

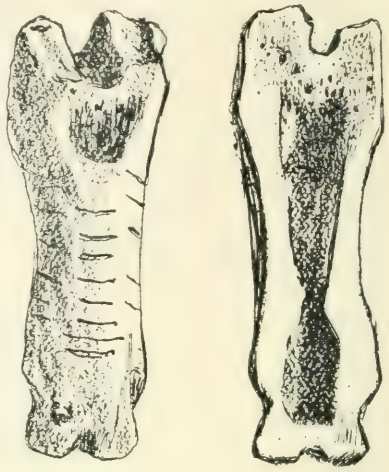


Fig. 43 (25,532). Full size. Fig. 44.

Bones of this kind are occasionally found with the flat side rubbed smoothly down as is shown by figure 44.

Fig. 43, however, differs from those on which the bars have been burnt, in having the cross lines cut with some sharp tool, and in having no fewer than eight marks along the ridge, and quite as many on each of the two sides, although the arrangement is much more irregular on one side (the shaded side in the cut) than on the other. The whole appearance of this specimen is suggestive of its having been used as a tally, or counter, rather than as a die.

Who Made the Bone Combs?

Among the people of almost every degree from the savage upwards the hair has been a object of solicitude as well as of pride. A volume might be written on its treatment in accordance with tribal and national methods. In the very lowest conditions of human society we may take it for granted that the fingers alone were employed for disentangling the locks, and for the removal of foreign substances and vermin. In more advanced conditions these operations were performed mutually as a matter of friendship, of ceremony, or, of necessity. Perhaps a thorn, a pointed stick, or a splinter of bone was found useful in "redding" the hair, and it may be that this usage, or the employment of two or more such objects in a bundle, gave rise to the idea of a comb, if, indeed, the suggestion did not come from the fingers themselves. However this may have been we find combs of wood, of horn, or of shell among primitive peoples in one part or another of the world.* Some of the shell combs with comparatively broad, triangular or saw-like teeth, may have been employed to press the woof in primitive looms, as the Navaho women do at the present time with coarse wooden instru-

*In the Provincial Museum we have samples of bamboo combs from the New Hebrides, one has only two prongs, and one has seven. These are somewhat clumsily made from the solid; but from Loango, West Africa, are specimens having as many as fifteen prongs, or teeth, each of which is an independent slip of bamboo; and all are boun dvery artistically to form a complete implement.

ments. Although it is probable that the combs were made by the men, it is equally probable that they were mostly used by the women, It is asserted that no Indian ever used a comb, and therefore never made one, until he got the idea from white people! and in evidence of this, reference has been made to the human and other animal figures that are carved on many of the specimens.

In the State of New York a larger number and a greater variety of bone combs have been found than in Ontario. In Bulletin 50 (March, 1902) p. 284, Dr. W. M. Beauchamp describes and figures about twenty objects of this kind. In his opening remarks he says:—"The Indian use of bone combs seems not very old, and yet is prehistoric in a sense. Most of those found are of the seventeenth century, but some seem a few years earlier, suggesting a knowledge of Europeans without direct contact. The early one are very simple in design, and with few but strong and large teeth. They are almost entirely confined to Iroquois sites, or those classed with them." On the previous page he says, "Artistic results in bone carving could hardly be expected before the Indians had metallic tools. So, when a well worked face or head appears, it is natural to infer the use of these, on what seem prehistoric sites." I am extremely sorry to differ from Dr. Beauchamp in his conclusions. There can scarcely be doubt that European contact and the use of metallic tools exerted strong modifying influences on old-time Indian mechanical methods. We cannot suppose anything more reasonable than this. It has always, and everywhere been so, under similar conditions. The Black Fellow of Australia could, and did, make a better boomerang with a Sheffield "thwittle" than by means of only a few bits of stone and shell. The Maori was able to produce a carved war-club, or paddle, with much less difficulty after he procured one or two steel tools than when he was confined to the use of obsidian or jade chips. The Fijian with a saw and a chisel made ten beautifully carved bludgeons in less time than it took him to make one in the old way. The West African Negro to-day executes marvellous designs on elephants' tusks much more quickly than he could when his blade was only a bit of native made iron; and the Indians of British Columbia carved immense canoes and totem-posts more quickly after Vancouver left them a kit of carpenter's tools. But boomerangs, and carved war-clubs, and paddles, and elpehant tusks, and totem-posts did not owe their origin as implements or as works of art to European contact; indeed, when a comparison of results arising from old ad new methods is made, it is not seldom to the disadvantage of the latter. Why, then, do we hear so much about "European influence" in this part of America in connection with any object of hitherto supposedly Indian origin, which shows the least evidence of superiority in workmanship, while we have no difficulty in conceding a large amount of innate mechanical and artistic genius to peoples afar off? Does it ever occur to those who attribute so little credit to our Iroquois and other eastern Indians to wonder why they should have proved such apt pupils as imitators and modifiers of European models, and yet be totally unable to originate a single idea beyond the most commonplace, apart from outside inspiration.

It is not quite easy to decide just where Dr. Beauchamp would place bone combs in point of time. "The Indian use" of them, he says, "seems not very old, and yet is prehistoric in a sense." What

this "sense" is we gather from the following sentence, which states that although most of the comb specimens found are of the seventeenth century, "some seem a few years earlier, suggesting a knowledge of Europeans without direct contact." This looks like a case of special pleading. It might be difficult to find a more painstaking and conscientious worker than Dr. Beauchamp, but here he shows extreme reluctance to credit the prehistoric Indian with intelligence enough to produe so simple a thing as is suggested by one's fingers, while at the same time the whole case is given away in the statement that "the early ones are very simple in design, and with but few strong and large teeth." This is the very kind we would expect to find. A object with fewer than three teeth we might hesitate to call a comb. Dr. Beauchamp figures six of what are presumably the earliest forms, all of which, probably—five, certainly—had originally four teeth. Is there here any confirmation of the idea that the hand may have suggested the comb?* In any event it would not seem to have been at all necessary for the Indian to wait for centuries combless, only to find out how desirable a thing a comb was by learning in some way that Europeans used combs.

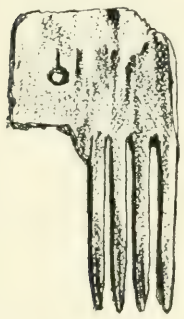


Fig. 45. (25,486). Full size.

There can be little doubt that after European combs became kown to the Indians, some changes in pattern resulted, but it would be of interest to many of us to know whether combs were imported very largely for Indian traffic, and what the prevailing patterns were which exerted so powerful an influence on the native fashion. Again, if combs were employed in trade would not the inference be that the use of them was previously established among the natives either for ornament or for use?

It would seem also as if we were unwilling to believe in the likelihood, or even the possibility of excellent work being accomplished without the use of metallic tools, notwithstanding what is known as to the expertness of many savage folk who were entirely confined to the use of only the most primitive appliances.

The specimens here illustrated came from what is known as the Walker and Sealey farm in Onon-

Fig. 46. (25,482).

*Figures 186 and 187, plate 18, and 196, 198, 199, and 200, plate 20, in "Horn and Bone Implements." It may be merely a coincidence that three coarsely made, and apparently old, combs in the Ont. Prov. Museum have had eight teeth each: two hands?

daga township, and were found by Mr. Walter M. Dick, of Brantford. Figures 45 and 46 are apparently of an earlier date than are those represented by figures 47, 48, 49, 50 and 51. They are not of the earliest type figured by Dr. Beauchamp, and which in our cases are exemplified by figures 588, 589, 590 and 8,071, all from the same locality as those figured in this report.

Figure 45 is very small. It probably had ten or twelve teeth if we may judge from the position of the suspensory hole. The teeth are very well finished, so well, indeed, that one might very readily suspect the use of metal tools.

A similar statement as to means of production might be made regarding every other specimen having enough of the teeth left for examination. The cuts appear to be cleanly, and in some cases, so closely made as at first to suggest the use of a fine saw, or of a file, but when examined from a mechanical standpoint, one can see that neither of these tools could have been employed. A file would have

Fig. 47. (25,481). Full size.

Fig. 48. (25,483). Full size.

separated the teeth at the very point only, and produced at the same time, a cut extending far beyond the intended head, or base of the tooth, while a saw would have left traces of its work in the squareness at the termination of the cut. Next to a thin, sharp flake or blade of flint, or of chert, a good jack-knife would prove most effective in the making of teeth in a bit of bone, and it may be that this handy pocket instrument found its way among the "redskins" at a very early period. Apart from the teeth, the carving on figures 47, 48,

49 and 50 might have been done by means of a good "Jacques de Liege," or as it was once called in Scotland, a "jocteleg."

Unfinished specimens are nearly always of great value in affording hints or clues with respect to working methods, and among the combs in this find we are fortunate enough to have one barely half made, figure 51. The bone, which is about three sixteenths of an inch thick, and slightly curved in cross section, is sharply shouldered down, about an inch and a quarter from one end, for the toothed portion, which is thus reduced to barely three lines in thickness. On the side not shown in the engraving all the teeth are cut down to the proper depth, but as may be seen, the work is incomplete on the side shown in the diagram. On account of the shoulders already

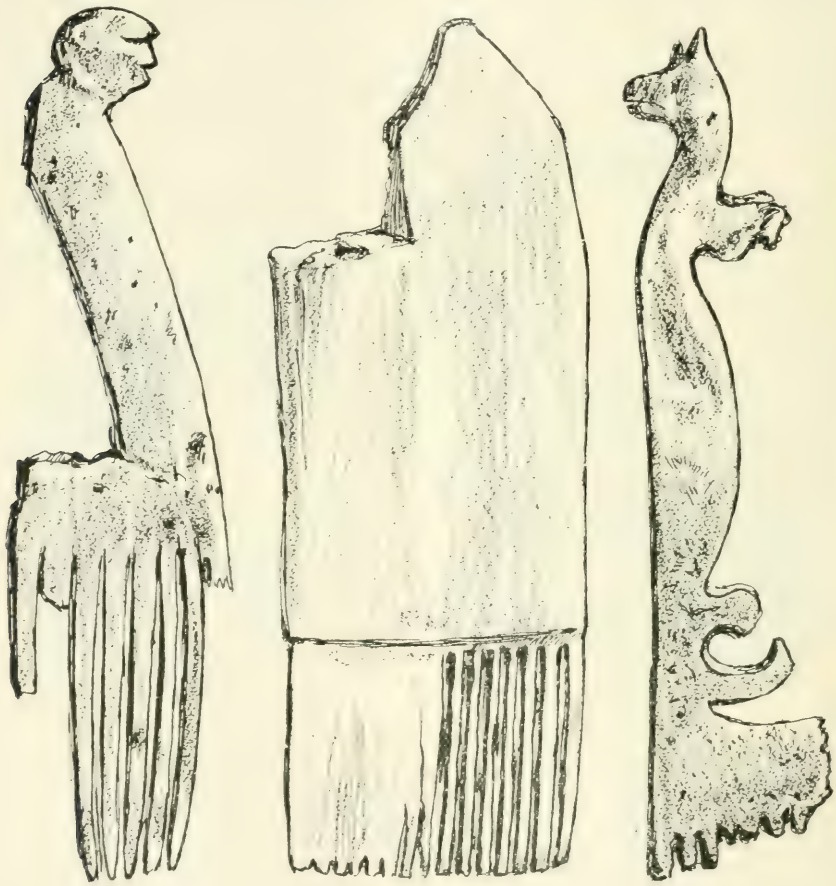


Fig. 49. (25,484). Full size. Fig. 51. (25,480). Full size. Fig. 50. (25,485). Full size.

mentioned at the base of the toothed portion, it was impossible to use a file, and the unfinished work shows that no saw had been employed. The work is rudely enough done to have been performed with "flints," but a steel knife was probably used. The appearance of the cutting at the shoulders would also lead to the supposition that such a tool was employed, but this only goes to prove that the makers

of these combs simply availed themselves of a white man's appliance to produce articles of this kind more readily, and, perhaps more accurately, than they had been able to do in the old fashioned way; and it would seem somewhat extraordinary to conclude that the Indian took to the making of combs simply because he had procured a white man's knife.

Having sent a copy of these notes on bone combs to the Rev. Dr. W. M. Beauchamp, he has kindly responded in vindication of his opinions as expressed in Bulletin 50. As he says we "want facts enly" and I am not at all anxious to maintain any attitude in opposition to them. The discussion may lead to good results. In any event, great weight should be attached to statements from such an excellent authority as he is. Dr. Beauchamp's reply follows this.

Bone Combs—A Reply.

By the Rev. Dr. W. M. Beauchamp.

I am glad you sent me your notes, for I would not like to go on your record as one who uses "special pleadings." I shall stand by my words, "not very old, and yet is prehistoric in a sense." Also, that (of the 17th century) "some seem a few years earlier, suggesting a knowledge of Europeans without direct contact." This is literally true. For example, the "Atwell site," from which fig. 199* came, was occupied about 1600, partly determined by connection of relics. From this came the bone fish-hook, fig. 214, decidedly a white man's pattern. On the same site I dug up a polished shell bead, undoubtedly made with metallic tools. From the same site as reported I figured, but only mentioned, p. 185, "a plain double comb," but doubted the location. This was certainly made with metallic tools. I have recently figured aboriginal combs from the same place. This site is "prehistoric in a sense," no European articles having been found, though its approximate age is clear. Its pottery, etc., closely connect it with the site near by (about three miles), where fig. 196 was found, much like the last. This site has abundant European articles. While one site is clearly on the 17th century, the other may be a few years earlier. No earlier combs have been found in Onondaga county.

In Montgomery county (Mohawk sites) no very early combs have been found; all are of the 17th century. Fig. 187 is "from a recent Mohawk grave" having European articles.

Fig. 198, from Hemlock Lake, I judge to be of the 17th century from the character of the clay pipe and bone ornament found with it. I had only a photograph of these.

The crucial test may be in Jefferson county, near Watertown, easily influenced by French trade at an early day, without direct contact. I have always considered that region the origin of Onon-

*The references made by Dr. Beauchamp to figures and pages are in connection with his Bulletin 50, Horn and Bone Implements, one of the very excellent series prepared by him, now being issued by the New York State Legislature.

daga migration, without the full proof I desired. As you will see, two barbed fish-hooks have been found there, certainly suggesive in point of time. I have seen several bone combs, all of the ruder forms; fig. 186 is one of these. They were made with primitive implements apparently, but one the owner would not let me even touch. Thy are unusual there. The point is *when* they were made.

On Iroquois sites, early in the 17th century, is the peculiar pottery having human faces and figures. In Jefferson county, where conventional faces abound, I have had fine opportunities for studying the evolution of these, and at last found the true face, but not on a village site. At my last visit, a few days since, I found a face from a village site identical with the Onondaga pottery; *even more than this*, from the same village came a cylindric bead of rolled *European copper*. So I have good reason to say that while no Europeans reached Jefferson county in the 16th century, their ornaments did, and may have influenced Indian art.

To recapitulate: In all the State of New York no instance of a bone comb has been reported earlier than about the year 1600, except in Jefferson county. I think I have seen three from there, my notes would show if desirable, and the Jefferson county sites are now brought down to the last half of the 16th century. Definitely, I have no extra reluctance "to credit the prehistoric Indian," etc., but I do not believe any New York or Canadian Indian ever made a bone comb until he had European hints. There is not the slightest evidence to show he ever did; the proof is all the other way. It is not a question of what might have been, but what *was*. I do not think it was "at all necessary for the Indian to wait for centuries" for bone combs, but he evidently did. I do not think the case in the least "given away" by any statement of mine. The early combs were simple for lack of tools, and the Indian did the best he could with those he had. As soon as he had saws, teeth and ornaments multiplied. I hope the case is clear. One of the combs I figured antedates the year 1600, according to my judgment, but falls within the 16th century , and this is the oldest known. Another approximates the year 1600. *All* the rest, simple or ornamental, are of the 17th century. I have written thus fully because I do not wish to be misunderstood, and don't want you to get into a wrong position, but I know you want the facts only. I do not, of course, believing that the Indian had his idea of making a comb from European examples, attach any importance to the *hand* idea. To me it is simply a question of how a desired result could be reached with the means. How large a bone can I easily work? How many teeth can I make with my tools? Beyond that you will readily see that, like our back combs, the intent was more ornament than use.

Yours truly,

W. M. Beauchamp.

A Shell Necklace.

In figure 54 we have an example of overlapping in point of time, as well as in workmanship. The necklace, which is wholly of shell, came to us through Dr. R. W. Large, who found the parts on the farm of Mr. R. Garrow, in King township, York county. The information respecting the circumstances of this find is not as explicit as we could wish. As a matter of course there was no string or

Fig. 54. $\frac{7}{8}$ diameter.

thread connecting these when they were found. Indeed weare not quite sure that they were all in the ground together. As at present arranged they clearly represent three periods.

Those of most recent make are the smallest, forming the upper part of the necklace. They are cylindrical, purple and white, varying in diameter from less than an eighth to three-sixteenths of an

inch, and are of white man's make. Nearly all the fictitiously valuable wampum belts are composed of similar beads, large quantities of which were made by the Dutch and French for trading purposes in the old colonial days.

Older than these, if we may judge from appearances, are the large pendant and two long beads next to it. The latter are simply portions of the columellæ of small marine univalves of a species larger than any found as far north as the St. Lawrence. The large shell disk (2⅛ in. diam.) is either very much indebted to European working methods, or the Indian mechanic was acquainted with the use of compasses independently of the white man. There is nothing to show that the shape of the disk itself was outlined by this instrument or by anything answering the same purpose, for the edge does not form a perfect circle, but the eight semi-circles round the edge have very clearly been made by some kind of dividers, as have also the very small circles as well as the rings they form, in the middle of the pendant, both sides of which are similarly marked. As this piece is slightly convex on each side, and of almost uniform thickness, it must have been formed from a very large shell.

The disks forming the middle portion of this necklace are so much weathered that it is not easy to say with certainty whether they are of European or of native make, but the well formed edges, and non-countersunk holes of a few, lead to the conclusion that, like the rest of the necklace, except those of columella origin, they are the work of the white man directly or indirectly.

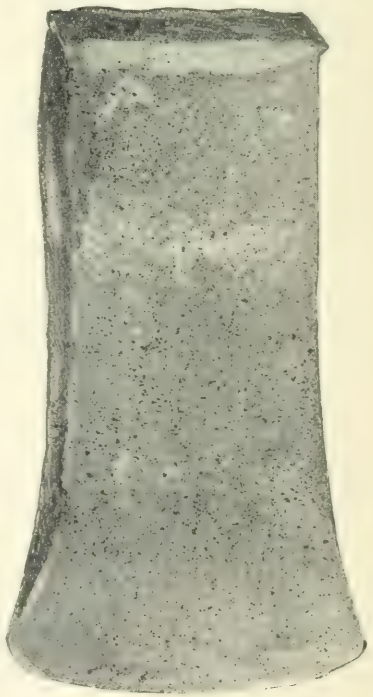


Fig. 55. (26,108). Full size.

A Few Copper Tools.

Figure 55 in its proportions is more suggestive of a European tool than is any other copper specimen in our cases, and yet the resemblance may be only accidental; a short piece of metal would make a short implement, and, as in the case of figure 59 the flaring may be accounted for in connection with the hammering necessary to thin the edge. The head of this specimen is a little battered, but this is probably the result of usage since the tool was found on lot 33, concession 2, Ernesttown. We are indebted to Mr. H. S. Davy, of Odessa, for this somewhat easterly example of a copper implement.

Belonging to a different class is the specimen represented by figure 56, which was found on Clearwater Lake, Rainy River District, by Messrs. H. B. Otis and E. Ball, and was procured from

them for us by Mr. John R. Boyle, Edmonton. It is a fairly good specimen of primitive smith work although not perfect in detail. The piece is slightly carinated from end to end, there being on both sides a double slope or thinning to the edges, a condition which, one would think, must have been brought about by grinding or rubbing rather than by pounding, as the latter operation is somewhat a difficult one, even for a skilled hammerman with the aid of good appliances.

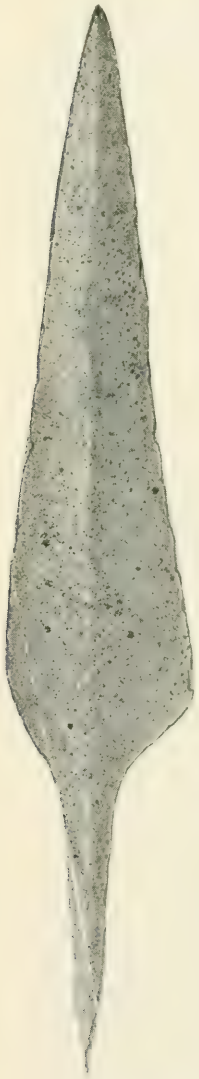


Fig. 56 (21,999). Full size.

The fish-hook (figure 57) is the only one of copper we have. It was found in water six hundred feet deep at a distance of fifteen miles from the shore of Isle Royale, Lake Superior, and was presented to us by Mr. Dobie of Port Arthur, through the Rev. Dr. John Maclean, now of St. John, New Brunswick. As there is no barb on this specimen, it is not very likely that any claim will be set up for its European origin.

Worked objects of native copper are not common anywhere, and the farther a given district is from the sources of the metal on Lake Superior, the scantier, as a rule, is their occurrence. In this province some excellent examples of native workmanship in copper have been found, and at least two, of a pattern so uncommon that we have no record of its appearance anywhere else. One of these, found in an ossuary, the site of which is within the present limits of Midland, was described and figured in the report for 1890-91,* while the other similar in shape came from Bexley township, and forms part of the Laidlaw collection.

Fig. 57 (17,811). Full size.

As a rule Ontario copper specimens are mostly in the form of plain axes, spear-heads, knives and beads. A few of the axes and spear-heads are provided with sockets.

Figs. 58 and 59 illustrate two of the most recent additions to the class of plain axes. Fig. 58 was found in McKellar township, district of Parry Sound, by Mr. J. M. Ansley, and was presented to the museum by Miss Elizabeth Ansley. It is a little battered on the poll (which is unusually small), but this may have been done since it was found.

*Arch. Rep. 1890-1, page 61, fig. 145.

Fig 58 (22,904). Full size.

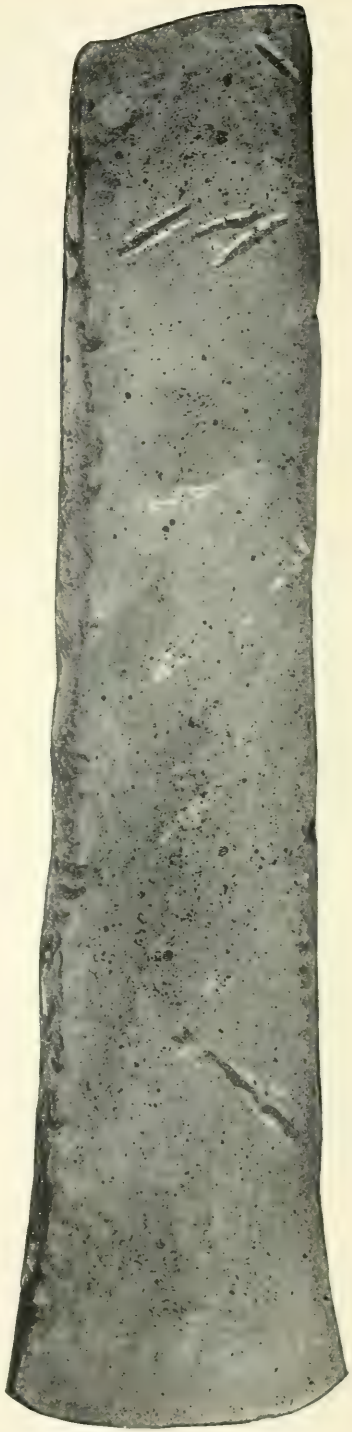
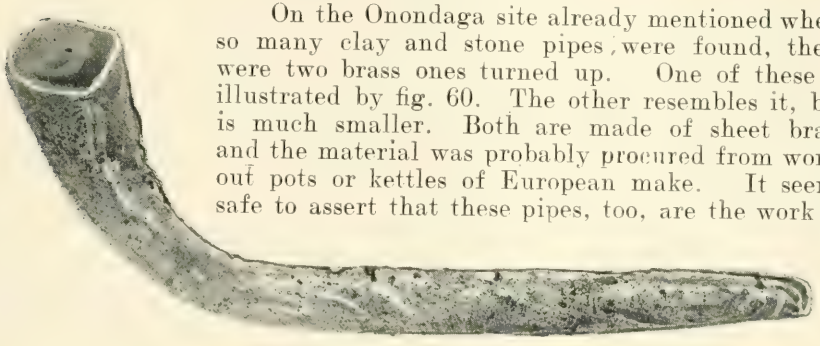


Fig. 59. (25,138). Full size.

Fig. 59 comes from London township, Middlesex county, Ontario. The only noticeable feature about this specimen is the rough style of finish at the poll end—not a finish that would indicate any intention to use the implement as a wedge, which some think was the only purpose such tools had. The flared lip is merely the natural result of hammering to thin the cutting edge.

A Brass Smoking Pipe.



On the Onondaga site already mentioned where so many clay and stone pipes were found, there were two brass ones turned up. One of these is illustrated by fig. 60. The other resembles it, but is much smaller. Both are made of sheet brass and the material was probably procured from worn-out pots or kettles of European make. It seems safe to assert that these pipes, too, are the work of

Fig. 60. (25,548). 4-5 diameter.

a white man. The edges of the piece of metal are very neatly overlapped, but owing to the verdigris with which the pipe is covered, it is impossible to say whether they are soldered or only hammered, but the latter is the more probable.

The head seems to have been formed on a mandril, although it is now slightly out of shape.

From a few traces of hair adhering to the stem, the pipe would appear to have been wrapped in a bit of fur before being placed in the grave. Perhaps other things were similarly treated at burial times, although the fur has now disappeared, but the copper salts have had a preservative effect. Two or three large copper specimens in our cases have pieces of beaver skin attachd to them, the fur of which is yet in a tolerably good condition.

Bored Skulls.

On opening an Indian grave near Arkona, Lambton county, Ontario, last summer, among the contents were found two perforated skulls, one, figure 61, having six holes, and the other (figure 62) having three. Both of these with some of the other skeletal portions were kindly presented to the museum by Dr. J. E. Brown.

In every respect, as far as can be ascertained, the interments had been made in the usual way, and the top of the grave was only some eighteen inches from the surface.

Other two skulls similarly treated came to us from the farm of Mr. Harry Mayor, lot 25, concession 12, Innisfil township, Simcoe county, a few years ago.*

Figure 61 has a few wormian bones in the occipital suture, the largest at the parietal fontenelle, the next in size is a little to the left, with a few smaller ones on the right side.

*Ontario Archæological Report, 1899, page 26.

Figure 62 is the skull of a more aged person than is that of figure 61, judging from the appearance of the sutures, the parietal one having almost wholly become anchylosed, and the occipital one, partly so.

The facial index of figure 61 is a little over 80, and that of figure 62 is 75, thus determining them respectively as brachycephalic and dolicocephalic.

Fig. 61.

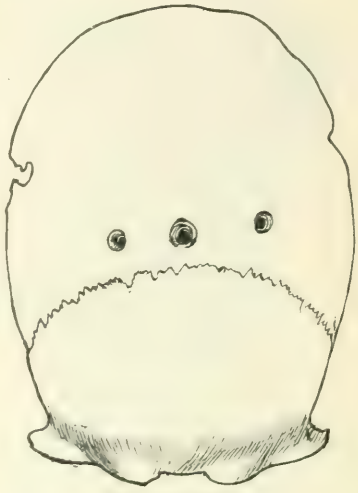


Fig. 62. 26,510.

It is somewhat difficult even to guess why skulls should be artificially treated as these and the Innisfil specimens have been. Of one thing there can be little doubt, and that is that the boring was *post mortem;* at any rate, there is nothing to indicate life energy after the holes were made, as we see in some cases where trephining has been performed on Peruvian crania, from which quadrangular buttons were removed by a sawing process.

A BURIAL PLACE IN ONONDAGA TOWNSHIP.

From time to time during the last fifteen years considerable quantities of valuable material have been received from a somewhat restricted area comprised in what is now the townships of Beverly, Ancaster, Brantford, and Onondaga, a large contribution from this locality having been presented to the museum by Mr. F. W. Waugh only last year. In this report it will be seen that specimens catalogued from 25,439 to 26,085 in our accession list have been added during the present year from this locality. These were collected by Mr. Walter M. Dick, of Brantford, at intervals during several years, and mainly from a number of graves he discovered on the Walker farm, lot 10, con. 3, township of Onondaga. What follows respecting this place and the specimens found there, is mainly from notes supplied by Mr. Dick.

That portion of the Walker farm on which the graves were found containing the specimens, forms, with a part of the adjoining lot, a roughly quadrangular peninsula, along three sides of which

flows a tiny stream. The accompaying sketch (figure 63) will enable the reader to make the necessary references.

The area of this land is not less than fifteen acres, and it varies in height (above the level of the creek) from about eight feet in the east to forty or fifty in the south-west. The bed of the creek is now dry in the summer, but no doubt formerly contained water all the year round.

The soil where the graves were dug is sandy.

Numerous camping sites may be traced not far from the graves, but these were almost certainly connected with a people or peoples, who occupied the ground before or after those who made it a burial place.

The graves are numbered to correspond with the order in which they were examined.

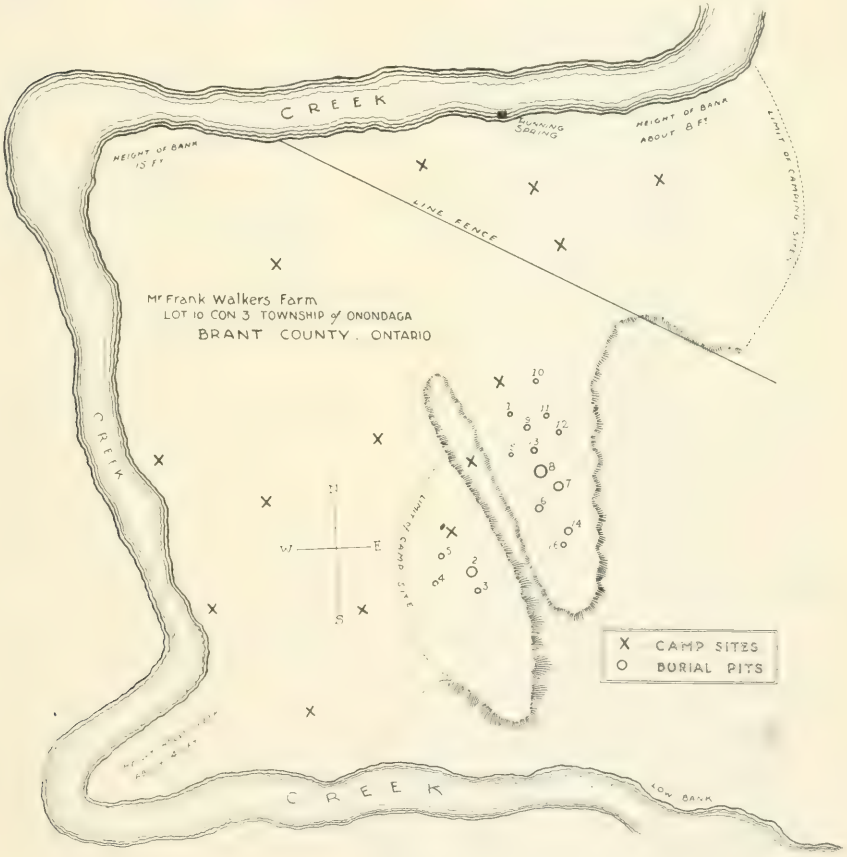


Fig. 63.

No. 1 was a little less than three feet in depth and contained two skeletons lying side by side. Besides the bones there was nothing, save a few shell beads.

No. 2 was eight feet in diameter and five feet deep in the middle. In it was some sixty-five or seventy skeletons, and some good specimens of relics.

No. 3 contained about twelve skeletons. In this grave was found a very well made white stone pipe representing an owl (fig. 6).

No. 4. In this grave there were nine skeletons. Besides the bones there was nothing here but an earthern vessel (25,439). Some of the bones lay at a depth of four feet from the surface, The stump of a pine about eight inches in diameter remained over this grave.

No. 5. In this grave only one body was buried. Nothing else was found in it.

No. 6 contained eight bodies, and with these were a few shell beads.

No. 7 was a large grave. Besides many skeletons there were numerous relics of excellent quality and many different kinds. A brass kettle was found here.

No. 8. This was a very large grave—fully twelve feet in diameter and six feet deep in the centre. As the bones appeared to have been thrown in, regardless of order or arrangement, and so many were in a decayed state, it is difficult to say how many bundles of bones, or how many bodies in the flesh were placed in this grave.

In the very middle of this ossuary was a child's grave not more than three feet in depth, and it was through first finding this that the larger burial place was discovered. With the remains of the child were found a few shell beads, and a large circular gorget of the same material, about five inches in diameter, perforated with five holes in a row. As the relics are similar in kind to those found in the other graves, the inference would seem to be that the smaller grave is not intrusive in the usually accepted sense, yet why so situated one may only surmise.

No. 9. Here there were the remains of eight persons. Nothing else was found.

No. 10. This was a single grave, and contained nothing but the bones.

No. 11 was a child's grave, in which was found a small shell gorget.

No. 12 contained the bones of only one person, with which were buried numerous interesting specimens.

No. 13. In this grave there were about a dozen of skeletal remains, and quite a number of fine archæological objects. This burial place was unusually deep in proportion to its diameter, its width and depth being five feet.

No. 14 contained numerous skeletons (the exact number was not ascertainable) and a large quantity of good specimens.

No. 15 was a child's grave. The only article found with the remains was a small shell gorget.

No. 16. Here there were some four or five skeletons and a few specimens.

A glance over the accesion list (25,439 to 26,085) will show that the burials in most instances, if not in all, were made subsequent to the arrival of the whites, and perhaps as recently as from 1700 to 1750. Of this we have evidence in the glass beads, iron axe, brass kettles, and copper wire.

Unfortunately the graves were not opened with any other purpose than simply to secure their contents, so that it is now impossible

to speak with anything like certainty respecting what many of the graves contained, neither have we anything to guide us in coming to a conclusion as to whether the camp-sites are of older or of more recent date than the burial places.

Special notes on some of the articles from the Onondaga locality will be found elsewhere.

A GOOD PIECE OF WORK IN STONE.

It is very seldom that anyone sees a more beautiful, or more comparatively, perfect specimen of workmanship in stone, executed by means of stone appliances, than that which is illustrated by figure 64, which was found in Comox, British Columbia. To say it is absolutely perfect, as is sometimes asserted respecting objects of Indian workmanship, would not be correct, but its degree of perfection is such as to bring out very clearly the capabilities of our British Columbian Indian, as a mechanic. The man who made this pestle had an excellent eye for symmetry and proportion. Now-a-days we have turning up here and there, writers who profess their ability to prove that it was only a trifling task to construct an immense mound; that the making of stone arrow-points was mere child's play; that the boring of holes of any size through stone was quite an easy matter, and one that could be accomplished very quickly; and that Indians didn't know very much about how to do anything beyond clubbing one another, until the white man came here. On this account it will scarcely startle us to be assured that the Rocky Mountain aborigines knew nothing about this form of pestle, or muller, or grinder, until after the arrival of some "Kintosh" or "Boston"* in the Straits of San Juan de Fuca, or of Georgia, and that the pattern

(22,046) 5–7 diameter. Fig. 64.

* "Kintosh" or King George and "Boston" are said to have been the names by which early British and American whalers and traders were known to the natives.

was copied by them from one in possession of a ship's doctor!

The pestle in question is exactly seven inches high, is three inches and a half in diameter at the base, and about two and a half at the top. In cross section no part of it is truly circular, yet the work in a general way is admirable, and quite as good as most white men could accomplish with excellent workshop appliances not including any kind of lathe.

This very fine specimen was presented to the museum by Mr. John B. Boyle, of Phoenix, British Columbia.

In Ontario the native was satisfied as a rule to use a large water-worn pebble of handy shape as his upper millstone, but to the south of us some pains were taken to make a form of muller or pestle roughly resembling the one here figured.

BRITISH COLUMBIA MUMMIES.

Mortuary customs although not a subject of the most cheerful kind are of much ethnological value. The great variety of them within the limits of the Dominion would surprise many readers. British Columbia alone supplies us with examples of what may be called mummies.

Fig. 65 (26,736).

Two of these figures 65 and 66 have come into our possession in a somewhat roundabout way, and we are not yet able to supply as much information respecting them as we would like. Inquiries made, have been to a large extent, unavailing. The most satisfactory reply comes from Dr. C. F. Newcombe, of Victoria, who writes:—

"I have myself seen on the west coast two modes of burial, one in caves or natural fissures and the other on the surface of the ground.

In both cases the bodies have been wrapped in matting and then placed in boxes,* plain, or painted with totemic devices and then simply deposited

*An excellent coffin-box of this kind in the museum is made without the board that forms the sides having been cut. The corners are half checked, and bent. Lid and bottom are shouldered deeply to fit over and outside of the sides, and the exterior is decorated with characteristic designs in black. See report for 1891, page 53.

on the surface of the ground or in the fissures. Usually these burial places are near the villages, often in the woods close by. Sometimes, as at Kyuquot, an isolated rock is utilized, which was formerly a fortified (palisaded) place of refuge in times of war."

From Mr. W. H. Jones, who presented us with the coffin referred to in the foot note, I learn that stones are usually piled cairn-like, over the coffins when placed on the ground. Even this, one would think not a very effective precaution against the attacks of predacious animals unless the bodies themselves are in such a condition when buried, as not to offer the animals any temptation.

Figures 65 and 66 are different views of the same mummy, and tell their own story so far as condition and appearance are concerned.

It may be stated that the date of burial of the bodies is not very remote, if we may take our clue from the fact that they were wrapped in coarse woollen cloth, of a deep red color, fragments of which are still adherent to the remains.

Fig. 66 (26,737).

Since the foregoing was in type, a letter has been received from Mr. John A. Coates, to whom we are indebted for the gift of the mummies. Mr. Coates' prolonged absence from home accounts for the delay in his response to my enquiries.

He writes:—"The specimens were obtained on the west coast of Vancouver Island. The largest one was obtained from a shallow cave on an island used for burial purposes. The smaller mummy was upon an island, and was wrapped in cedar bark blankets, and covered by some split cedar boards.

These evidently belonged to the Clayoquot tribe."

There is still much, no doubt, to learn respecting the mortuary customs of the people with whom the mummies were connected.

THE STANDING ROCK.

By F. Birch.

To the lover of Indian lore, (and comparatively speaking, there are but few) there is found on page 106, Archaeological Report, 1902. a paper of thrilling interest from the facile pen of the Rev. A. E. Jones, S. J., Loyola College, Montreal, and more especially does this apply to the people of Collingwood, Craigleith, Thornbury, and surrounding country, directing attention as it does to a matter of aboriginal history, regarding the Huron nation which existed in their immediate neighborhood. Father Jones discovered the "Standing Rock" (mentioned in the Jesuit Relations) in the Township of Nottawasaga near the junction of the Townships of Collingwood and Osprey, and located the Indian villages of St. Mathias and St. Jean, the former below the Rock of Ekarenniondi, and the latter, with a population of six hundred, twelve miles further south in the Township of Osprey. It is well known that the inhabitants of those villages cultivated corn, pumpkins, sun-flowers and tobacco. At St. Jean, allusion is made to the curing of and the rapid and successful growth of the indigenous tobacco plant, page 112. Now, I cannot help but think that after all, Father Jones has not found the right place, and I shall now state why I disagree with him. I contend that in those days, corn and tobacco could not be grown on the tableland of Ontario, so far from the lakes or from Georgian Bay, as Osprey, on account of the summer frosts. The "oldest inhabitant" (and surely he ought to be entitled to some respect), is emphatic on this point. Many farmers in this section of the country can speak by bitter experience of the terrible effects of the frosts of early days. I have seen the wheat when it was nicely out in head, cut down to within two inches of the ground, and the timothy utterly destroyed in Osprey, Holland, Artemesia and Euphrasia. Artemesia became a byword and was called the "Heart of Misery," but happily this condition of things has passed away now that the country has been cleared and cultivated. In our day, at the base of the Blue Mountains, farmers are about two weeks earlier with seeding and harvesting than they are in Osprey and the southern portion of Euphrasia. There could be no inducement to found a village in Osprey unless for the abundance of game. Elk and Moose abounded. Occasionally the remains of both animals are found with those of wolves in the deep crevices of rocks that intersect the ground in some places. After many inquiries among the people of Osprey I have failed to find any evidence that Indian villages existed in the township, and they all assert that such rocks as those in the "Devil's Glen" are common in this part of the Province. Assuming that the summer frosts rule out the existence of those villages, where then shall we look for Ekarenniondi of the Petuns? I would suggest about five miles and a quarter further north in Collingwood at the place known as the "Indian Caves." I had heard of an Indian village site below the caves, and was positive of another on lot 28, con. 10, Collingwood, twelve miles away, which tallies with Father Jones' account, only that it is to the west instead of the south. I determined to investigate as soon as opportunity offered and if possible to find St.

Mathias. This would give the necessary condition. The two frontier towns at the confines of the Petun nation were open to attack from the direction of Toronto, the gateway to the Indian country. I went to examine the "Indian Caves," lot 14, con. 2, Collingwood, Oct. 9th, and the weather was all I could wish for. Fire had run over the base of the rocks and burnt down the standing timber, and a thick growth of underbrush had taken its place, affording a splendid cover for partridge and the cottontail. The rocks extend east and west for half a mile, and a cleavage runs the whole length, the detached portion having settled downwards and outwards, and in places the top has fallen back into the fissure, leaving caves underneath, but in some places standing entire. Being alone and a stranger I did a lot of hard climbing which could have been avoided had I known what I do now. I took "Excelsior" for my motto and went up and over every obstacle. Farther to the east Mr. Blaikie has a good road for the accommodations of visitors, of whom thousands visit the caves every summer. I found the rocks rough and rugged, and on a grander scale than any I had yet seen, and more than one place which might be truly designated the "Standing Rock," but there is a particular spot on Blaikie's farm where the rock overlooks the old village, and this I think is Ekarenniondi. Picking my way carefully among the debris, I came to a sort of amphitheatre forty or fifty feet in diameter where a second slice had fallen off the main cliff and into the chasm, making a floor about fifteen feet below, which was covered with vegetation. Looking down I was surprised and pleased to find I had intruded on the private domain of a porcupine all in his "fretful quills." I watched him for some time as he fed on the leaves and berries, and I thought to myself, well there is a "Huron" that no Iroquois brave would like to fall upon. I spent nearly two hours clambering among the rocks, sometime down in the caves (where the sun's rays never penetrated) then up on the pinnacles until I was thoroughly satisfied that here was the "Standing Rock." In one place the rocks rose in the shape of a pyramid with two huge blocks on top, side by side, affording space enough to accommodate a dozen men. Here I took my stand and looked on a scene of marvellous beauty; to my right was Ossossane where the fugitives from the Huron villages crossed on the ice, journeying the whole night to reach the friendly shelter of St. Mathias (at least I presume so), page 110.

How I came to find the village site of the "Standing Rock" or (what I suppose to be) St. Mathias is as follows:—

Some twenty-five years ago I was informed by a farmer that where he had built his house and cleared his garden patch, had once stood an Indian village. He described how the lodges must have stood in a circle, by the position of the beds of ashes which he found here and there, and the ashes were deep. He spoke also of finding tomahawks, pipes, bones, pottery, etc., etc., all of which information afforded me great pleasure, but I could not find time just then to investigate, and I little thought that I should ever be back to the same place, but it is always the unexpected that happens.

Going down the mountain road a short distance, I turned into a byway leading off to my right, and going in an easterly direction. A few minutes walk took me to a farmhouse belonging to a family by the name of Haney. I found them a very friendly people who re-

ceived me kindly and soon made me feel at ease. In interviewing them I was much disappointed at first. I could not glean any tidings of my friend Smith, but after chatting some time, suddenly Mrs. Haney remembered that a Thomas Smith had once lived there, but had since died; that was all I wanted to know. After that, all was smooth sailing. I was on lot 14, con. 2, Collingwood, owned by Samuel Haney, the very place I was searching for. The village site is at the north end of the lot, and at the south end the rocks stand out in bold relief. The village had stood on slightly rolling ground, just enough so for sanitary purposes; it had an easterly exposure, and was on the west bank of a brook whose spring came from the rocks above. Miss Haney took me to search for "relics." The potato patch where we went just north of the house had been harvested so that the ground was nice and clean. I counted four middens in this patch and near the bank of the little stream; each of them I should judge would be twelve feet square, and a foot deep or more, and were north of the village on lower ground. With the spade I happened to turn up some of the subsoil, and behold there was "Paint with which they were wont to daub their faces," Archaeological Report, 1902, p. 107. The clay was rich in oxide of iron, and with a mixture of grease would answer the purpose quite well. Miss Haney said "anything you find you are quite welcome to; we have given away a great number of pipes to visitors." I thanked her, and strange to say in a few minutes the young lady handed me an excellent pipe picked up at my feet and which I had passed unnoticed. It was of limestone, with a reptile carved in bold relief upon it. It was stemless and had holes bored through the bottom for a string, perfect in all but the head of the reptile which was broken off. I found several portions of broken pipes and pottery; two bears' tusks, a portion of a human skull and a strip of iron about five inches long and two inches wide, sharpened at one end for skinning or scalping, perhaps it was a piece of a sword blade. This goes to prove that they were in touch with the French. Miss Haney also informed me she had found a quantity of large beads, about one hundred yards north of the village, but unfortunately they had been either lost or stolen. I attach great importance to these beads. I think probably they belong to a priest's rosary.

I noticed one thing in particular when I left home, namely, that everything had been cut down by the frost, while here, on lot 14, con. 2, all was fresh and green, no sign of frost whatever. Half-past four p.m., came all too soon, and it was with a slight twinge of disappointment that I found my holiday at the Blue Mountains of Collingwood had ended, but time was inexorable and I had to depart, but I left with the satisfaction that my exploration of St. Mathias had been successful, still, I cannot prove that I am right, but my reason for writing this article is simply this—believing that Father Jones has made a slight mistake of five miles in spite of all his elaborate calculations, owing to those misty documents written by the old French Chroniclers who have got things a little mixed, I would like if possible to make them right as far as my knowledge goes, and to help to find the spot, and perpetuate the fame of those brave, noble-hearted, self-denying missionaries, who sacrificed their lives for the good of the cause they represented. The Standing Rock would have remained a mystery but for the labors of Father Jones, as well as for his very exhaustive and charmingly written essay in the Archaeological Report for 1902.

VICTORIA COUNTY.

By George E. Laidlaw.

New sites reported, but not visited, are as follows:—

No. 36. East half lot 20, con. 8, Eldon Township, owned by Donald McArthur, cleared by J. Sutherland forty years ago, site now occupied by buildings, usual relics, ash beds, pottery fragments, etc. Also, a skeleton found under the roots of a large maple tree.

No. 37. Lot 6, con. 10, Carden Township, owned by Patrick Duggan; attention being called to it by John Cuppins, Cameron P.O., who found relics there in 1902. The usual class of site, situated on a high, gravelly hill, beaver meadow close to hand. Arrowheads occur here.

No. 38. A large area on Mr. Bruce's farm yielded lots of pottery fragments and other relics, when first cleared many years ago.

Lot 41, S. P. R., Eldon Township, Kirkfield P. O., Mr. Bruce recovered a whole pot from this place, and said the place was literally paved with relics when he first went on the farm. My attention was first drawn to this site and No. 36 by Mr. S. Truman, Kirkfield.

No. 39. W. Thornbury's lot 12, con. 10, Eldon, is another site in the group north of Goose Lake, Eldon and Fenelon Townships, distant about three miles. The usual relics, etc., prevail here.

In connection with these sites I may say that they are not immediately on the edges of lakes or water-courses, but some little distance inland in hilly localities with soil eminently suitable for aboriginal cultivation, and with the exception of No. 37, which is north of the Talbot River, lie a good distance south of the Portage along the Talbot River. Nos. 36 and 38 may be classed in a group with Nos. 9 and 10 (see Report for 1901, p. 106), occupying the high hilly table land south of Kirkfield.

Relics.—A copper arrowhead picked up by myself, on site 20, last September, block E, Bexley, on lake shore, much weathered; dimensions three inches long, by seven-eighth inches width of blade, which is flat, and not possessing the triangular cross-section so common to copper spears and arrowheads. The socket is slightly shouldered to prevent the shaft from slipping up the blade, and is one and one-quarter inches long.

Iron knife made from saw blade, evidently shaped with a cold chisel. It is in an unfinished condition, was found on banks of Grass River, Victoria Road, P. O., presented by Dr. Jas. Grant. Blade, six and one-half inches long, tine two inches. Some doubt may be thrown on this relic, as it may have been made by some early pioneer or hunter. It is worthy of remark that the cold chiselling has been done all on one side.

A very large stone bear pipe was found in August or September, 1902 , on lot 6, con. 20, Tiny Township, Simcoe County, Ont., by Mr. T. H. Newberry, who disposed of it to Mr. Oliver Glaspell, Powle's Corner P. O., Fenelon Township, Victoria County, from whom I obtained it. Was found on the route of the Indians, or trail, from Sawlog Bay to the highlands of Tiny; no other relics were found near it, it being found on the surface of the ground. Thus, to my mind, relegating it to the later Hurons, or to the Algonkins,

who occupied that locality upon the forced retirement of the Hurons. The pipe was in a fragmentary condition, and is now restored *minus* the forefeet and a portion of the frontal bar. Material, a dark grey slate; posture similar to the animal pipes figured in report for 1902, pp. 40-43. Dimensions six and three-quarter inches in perpendicular height, distance between parallel lines at back and nose four and one-quarter inches; greatest thickness of body from side to side, two inches; greatest depth of body from back to front, two and eleven-sixteenths inches; length of head, two and three-sixteenths inches; breadth behind ears, two and seven-sixteenths inches. Stem hole bored with a tapering drill, bowl shows plainly drill rings, and contracts very rapidly, being two and one-half inches deep and three-quarters wide at top. Stem hole is at the back. Eyes are large, deep, circular depressions. Ears prominent and rounded, the right one evidently being slightly broken at one time, and then ground smooth. Ear holes slightly defined, as also are the nostrils—most rare occurrences. No slots or markings on surface of pipe other than those that represent the claws. No basal perforations, though there are deep depressions produced by boring where the basal perforation is usually situated in these pipes. A deep nick terminates each hind foot, separating it from the frontal bar, thus showing probably that the designer did not intend the frontal bar as a branch clasped by the feet as in other cases, but rather as produced, tail and hind paws slightly raised from body. The portion of the frontal bar immediately opposite the hind feet is slightly larger than the remaining portion. The top of the frontal bar, and the fore feet are missing. Mouth strongly defined, face very much "dished" or "hollow," strongly resembling a raccoon's, but the jaws are too long in proportion, and too square at the end to resemble that animal in any marked degree. The drill has been used in forming the throat, and marks of sawing and rubbing also appear. Are these what McGuire calls "file marks" in his aboriginal pipes, etc.? The material changes to a dirty purple on the frontal bar: weight two and a half pounds avoir.

It has been suggested that this specimen represents the brownish variety of the common black bear. At any rate, the contour of the face is directly opposite to that of the Bolsover bear pipe, p. 40, Report 1902. This pipe is of purely aboriginal workmanship, the design being bold, the head resembling style of Huron clay pipes. The pipe, though called a bear-pipe, shows a composition of features; in the large, round eyes and hollow cheeks of a raccoon, and the strong heavy jaw of an old dog wolf. The marks of boring on the surface of body show the use of blunt drill.*

VILLAGE SITES IN NORTH ORILLIA.

One of the best known village sites in North Orillia is to be found on the farm of Mr. Amos Rogers, lot 6, concession 13.

When first "located" for settlement, now nearly seventy years ago, Mr. Rogers' father observed what seemed to be comparatively

* It is probable that a full description and illustration of this remarkable pipe will appear in the Archæological report for 1904.

recent signs of a clearance, that is, an area of some two or three acres was occupied by trees of considerably smaller growth than those of the neighboring bush; and it is said that straggling Indians camped occasionally on the spot.

Since the land has been cleared, numerous traces of Indian occupation have come to light, in the shape of broken pottery, flint chips, pipes, and stone tools. Mr. Rogers had brought some of these together, but all were lost in a fire which destroyed his dwelling house. We now have records of numerous fires in which larger or smaller collections of Indian relics have been destroyed, and the moral is: Do not keep your archaeological specimens at home—send them to the Provincial Museum, where they will be not only comparatively safe from destruction by fire, but will be available as objects of more or less interest to everyone concerned in the study.

A close examination of the ground on two visits failed to disclose much on the surface, but perhaps, when the ground has been loosened by the plough, evidences of occupation will be made more apparent.

From Mr. Rogers and others, I learned that some years ago a shallow grave was discovered not far from the village site, and that two bodies were found in it.

The village site on the Rogers farm is at the northern extremity of Lake Couchiching, and was at a convenient distance as a halting-place before or after passing the Severn, or it may mark what was one end of the trail, or portage, of which the old settlers say there were numerous examples between Couchiching and the Muskoka hunting-grounds.*

One of the best known village sites in North Orillia is to be found on the farm of Mr. Rogers to the Provincial Museum.

A few fairly good specimens were kindly presented by Mr. Rogers to the Provincial Museum.

A short distance south of Washago, in the Township of Rama, another village site is reported on the lake shore, but as it is on land forming part of the Indian reserve not very much is known respecting it .

Not very far away from the Town of Orillia, on lot 6, concession 5, there is a somewhat unusually large and interesting village site to which attention was directed by Mr. C. H. Hale, who was also good enough to accompany me to the place.

It is on the brow and summit of the highest terrace rising from Lake Couchiching, and its greatest elevation does not, probably, exceed forty feet. The situation was an excellent one for aboriginal strategic purposes—far enough away from the water's edge to be thoroughly obscured by the surrounding forest; high enough to give it command of approaches from the shore, and capable of being well protected on the land side by means of the ordinary Indian methods. In addition to these advantages the terrace at this point has been eroded deeply, and forms a gully, the sides of which are so steep as to make the climbing of it anything but easy.

It is now many years since the land here has been cleared, and most of it cultivated, in consequence of which, and the whole area being in sod, there are scarcely any surface signs to indicate that here was once a village or town—perhaps one of the original Cahiaques. Many native born Orillians, however, of mature years, have a dis-

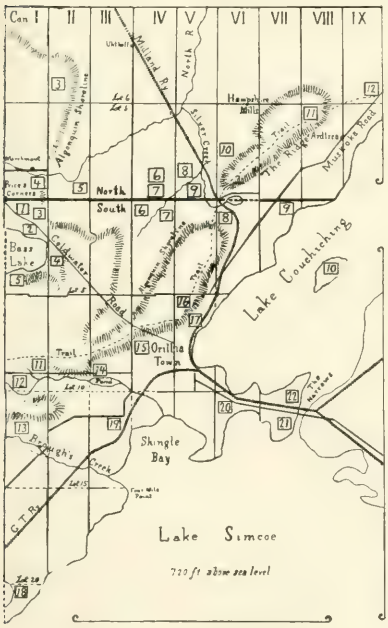
tinct recollection of the numerous ash-beds that marked this place, and from which, I am assured by Mr. Hale, both young and old used to dig up clay pipes, flints, and implements of various kinds.

Mr. J. H. Hammond, Solicitor of the Supreme Court, Orillia, writes:—"Orillia seems to me to have been a very populous place in the early days, and the subject has been studied by me for a number of years, in fact, since boyhood, tracing as well as I was able the different village sites; in fact, I do not know all of them yet, as within the last few days I have heard of two more that will be verified by me as soon as the snow is off the ground. I have visited over forty-six of these sites, all within the bounds of Orillia, North and South, all with well-defined ash heaps and pottery (broken), so you see that the subject is to me interesting as well as instructive."

Mr. Hammond has rendered very valuable assistance to Mr. A. F. Hunter by way of directing attention to village sites.

INDIAN VILLAGE SITES IN NORTH AND SOUTH ORILLIA TOWNSHIPS.

The settled parts of both townships are hilly. The ends of two long ridges come out of the adjoining townships along the west side, —the one out of Medonte into North Orillia, the other out of Oro into South Orillia. Besides these, a long ridge runs through both townships, near Lake Couchiching and parallel with it, for several miles. This prominent line of high ground, which takes a northeasterly direction, is known locally in North Orillia as "The Ridge." It extends as far as the ninth concession of that township, and owing to its isolated position, it is quite a conspicuous feature in the landscape. It deserves our special attention, as it is, in a sense, the barrier that holds back the waters of Couchiching from pouring directly over to Georgian Bay, deflecting them by the Severn River.



At the town line between the north and south townships, there is a break where "The Ridge" in North Orillia is cut off from the high ground in South Orillia. Branches of Silver Creek take rise in this gap, becoming fair-sized streams; and the Midland Railway utilizes it for a passage. Village sites of the early Huron period, some of them quite populous, are found generally along "The Ridge," but are more numerous in the vicinity of the Silver Creek openings than elsewhere.

The "Algonkin" shoreline girdles these hills or ridges, as elsewhere; and this extinct shoreline is marked on the accompanying map to give the altitudes of the different parts of the townships. The "Algonkin" is a strong shoreline everywhere, but in the Orillia townships it is even stronger than elsewhere. The main cutting is very distinct, and about sixty feet lower the base of the submerged filling also becomes a well-developed shoreline. The term, as used in this report, applies to the main cutting. This main strand of the shoreline, in the vicinity of Silver Creek, attains an altitude of 875 feet above sea level, or 155 feet above Lakes Simcoe and Couchiching.

North Orillia is a large township, but parts of it are still covered with original forest. It has, accordingly, been found unnecessary to show more than a portion of this township on the accompanying map.

The Village Sites.

The list of 34 sites (12 in North Orillia and 22 in South Orillia) may not contain one-half the sites that will ultimately be recorded for these townships. It is necessary to emphasize that I make no claim for completeness of perfection of the lists, especially that for the north township. But the sites I give are the more conspicuous ones, and will lay a foundation for future work by showing the lines of early occupation and travel. Even these show evidences of a considerable population in the early Huron epoch,—the first half of the seventeenth century.

The plan followed here being the same as in earlier reports, the task of collecting the data and its attending difficulties have been sufficiently dwelt upon in these reports. In the present one, equal pains with those previously issued have been taken to make the observations correct, and the features described may be verified in most cases by everyone for himself.

The Huron occupation of the region now under consideration, in relation to its physiography, was not different from that of the townships previously examined. The Hurons kept to the high ground or ridges, as we found them doing elsewhere. The ground in the south part of South Orillia was not well adapted for occupation by Hurons and their allies. It is too stony and gravelly, and the small ridges there are too abrupt and narrow for their settlements. The high ground above the "Algonkin" shoreline in the north half of South Orillia, according to the remains that have been found, was their favorite habitat. Besides this, Brough's Creek and its branches, falling into Shingle Bay, made a wide obstructive marsh.

Like the other townships of this district, each of which has an important feature of some kind, the Orillia townships have one of their own not less interesting than the others. They contain the line of contact between Huron tribes and those named Algonkin in the Jesuit "Relations." Some of the village sites show differences of their own, when compared with villages in other townships known to be distinctly Huron. Hence, I am of the opinion that the former were the villages of the Algonkins. There may have been some overlapping of the Arendarronons (the most easterly Huron tribe) with the Algonkins, so that some sites belonged to one and some to the other. And as the sites here as elsewhere do not all belong to the same year, or even to the same period, one may have followed the other over the same ground. Further study of the sites will, perhaps, reveal some movement of this kind. But in any case, the sites which I am inclined to call the Algonkin sites have distinct characters, and might also be said to preponderate over the Huron sites in the Orillia townships.

The Indians who inhabited the sites which show the differences just refered to, when compared with those of known Huron sites, show marked development along certain lines. The more conspicuous of the differences are as follows:—

1 Disks. There is an abundance of stone and pottery disks. These are found in small numbers on some known Huron sites, but not in such profusion as we find in the present instances.

2. Individual burials. A patch of single graves is to be found at every one of the sites in question. This is unlike the mortuary practices of the true Hurons who practised scaffold burial, combined with bonepits. In most cases, however, the patch of single graves is accompanied with a bonepit or two.

3. Highly decorated pipes and pottery. In the ornamentation of clay pipes, the pictorial art had a more extensive development in the Orillia townships than in the townships farther west where the true Hurons were located. We may safely conclude his ornamentation was due to Algonkin influence, whenever it is found on Huron sites. It is not to be understood that modern Algonkins necessarily show a continuation of the skill of their ancestors, or any trace of it. It was the Algonkin-speaking tribes of three centuries ago to which our remarks apply.

4. Bone needles, awls, etc. The greater abundance of these on the sites called Algonkin, by us, may have been due to better supplied hunting grounds than the Hurons possessed. The latter tribes were more agricultural in their pursuits, and more populous.

5. Flints. These are more abundant than on true Huron sites.

6. The Algonkins showed remarkable ingenuity in forming arrow-heads out of pieces of brass from worn out brass kettles.

Some of the features just mentioned resemble those of some sites in the district near Balsam Lake, for the descriptions of which we are indebted to Geo. E. Laidlaw. The Orillia townships are not far distant from some of the sites which Mr. Laidlaw has described, and the points of similarity of some sites are therefore not to be wondered at. His descriptions in former Archæological Reports bring out well the points of contrast between a proportion of the sites in his district, near Balsam Lake, and true Huron sites.

For locating the position of Ste. Elizabeth, the mission of the Jesuits among the Algonkins of whom we have been speaking, Ducreux's map, although it gives this mission, fails to help us much, as there is a confusion of North River with Severn River, and the entire omission of one of them, as I previously pointed out. It is possible, however, that Ste. Elizabeth was in the distinctly defined group of villages near Silver Creek. In townships previously examined, we found evidence to show that a mission often belonged to a district marked off or isolated by physical features; and the one in question is so distinctly defined as to lead us to make this conjecture with a fair degree of probability. On the other hand there is a group of sites north of Bass Lake, partly in Medonte Township, occupying a similar position with reference to North River that Silver Creek group does with reference to Lake Couchiching and the Severn, and it will be impossible to settle the question definitely without taking into account the group partly situated in Medonte.

European relics are abundant in the Orillia townships, and this is one of their chief characteristics. Iron or "white-men's" relics have been definitely reported from 26 of the 34 sites, or 76 per cent. of the whole. In this respect, the Orillias agree with the northerly tier of townships—Tiny, Tay and Medonte.

Some people have claimed that Cahiague, the Huron town visited by Champlain, was situated near Lake Couchiching, and was

perhaps the Mount Slaven site. The improbability of this site having been Cahiague is discussed in the description of the site itself.

Burials.

There are eight bonepits reported, viz., at Nos. 6, 7 and 10, North; and at Nos. 3, 4 (2), and 15 (2), South. Two pits each are reported for the two last mentioned sites. Patches of single graves or individual burials occur at even a larger proportion of sites than in townships hitherto examined in our passage through the district of the old Hurons. Figures thus based on aggregate results afford us reliable and instructive data. In short, we have found this practice of burying in single graves where we locate the Algonkins; and we may, therefore, conclude that the single burial grounds in the other townships (such as No. 41, Oro), were due to the presence or influence of Algonkins. Bonepit and scaffold burial was evidently the rule among Hurons.

Trails.

In these townships, as elsewhere, the Indian had his trails in accord with the hills, valleys and streams, following their natural order and positions. The white man pays but little attention to these circumstances, and has almost forgotten to take them into account in his reflections on Indian days and ways, except in one or two cases, notably the Coldwater Road. The Town of Orillia, like most other towns of our fellow-Caucasians, is built at the meeting-place of several Indian trails. It is or was in the days of the forest and the red men, the centre point of branching routes. These were for the most part, not canoe portages, but forest trails, pursued by the Indians when journeying without canoes. It may be expedient to take these trails in order, passing around the various trails as around the spokes of a wheel.

The Muskoka Road. From the abundance of relics and sites found along the high ground in South Orillia, and thence along "The Ridge" in North Orillia as far as the ninth concession of the latter and beyond it, it is evident that a trail followed the ridge parallel with Lake Couchiching, but inland some distance from the lake shore. The writer has frequently pointed out in connection with other townships, that the ridges, which were wooded with hardwood chiefly, invariably had trails along them. The low, flat land contained swamps or thickets and were less penetrable for walkers. The present instance is no exception to the rule. From Orillia Town to Washago, the Muskoka Road, opened prior to 1858, along the east flank of the ridges, and also parallel with Lake Couchiching, is the modern representative of the old forest trail. The present road, however, runs perhaps a little nearer the lake than did the old trail itself, yet the two follow the same course. This trail was in use down to modern times. The Rev. Dr. Gray and other early settlers testify to the existence of the trail here within their remembrance. There were also portages to the Severn River, and these crossed the Muskoka Road or trail to Washago.

The Coldwater Road. This was a long portage from the Narrows, or rather from Lake Couchiching at the point where Orillia Town now stands, to Coldwater on Matchedash Bay, its length being

fourteen miles. In 1830, when Sir John Colborne, the Governor of Upper Canada, collected the Chippewa tribes of the district into a reserve here, extending along the portage, the original trail was cleared out as a road for vehicles, and it has remained an important highway to this day. Northwestwardly from the fourth line (S. Orillia), at the Orillia Cemetery, this road now runs through flat ground. But there is a conspicuous bar of gravel and sand, or old lake ridge, across this valley or channel, only 15 or 20 rods north of the present surveyed road. This bar would carry the original trail. A similar remark applies to the crossing of another channel nearer Bass Lake. Elsewhere the present course for the road is almost identical with the trail.

The Huron trail out of Oro to Orillia town site. This trail, which is the one Champlain evidently followed, is now represented by the Oro Road. Although the latter follows a straight course along surveyed lines, it carries a large traffic over the same route, the lines of transportation for white men being almost the same as those for their red predecessors, as in so many other places.

The Atherly Road. This evidently follows the old trail from Orillia Town to the "Narrows," used when the aborigines travelled without canoes.

CATALOGUE OF SITES—NORTH ORILLIA.

i.

On the east half of lot 21, concession 5. This place is far down the North River. Cranberries and huckleberries grow plentifully in the neighborhood, and have attracted the aborigines thither from time immemorial. Surface rocks make their appearance a little way off (viz., about lot 22) and extend northward indefinitely. In the summer of 1902, Fred Longhurst, the owner of this lot, plowed up an Indian's skeleton and an iron tomahawk.

ii.

On the east half of lot 11, concession 3. Jay Walker. This site occupies a hill, and numerous relics have been found, including iron tomahawks. Flint arrowheads are plentiful.

iii.

On the west half of lot 6, concession 2. Chas Clark. They have found numerous relics and fragments, especially in their garden, but the site has been partly obliterated by cultivation. It extends into lot 7, formerly owned by the Drinkwater Brothers. The land hereabout is flat, but a little way east drops at one of the "Algonquin" shore lines.

iv.

On the east half of lot 2, concession 1. A. Margrett. On the south side of the North River numerous remains have been found. Chas. H. Moffatt once lived here and found numerous relics of the

usual kinds, but it is noteworthy that his family found no relics of Euroupean make. They found many good flints here, but pottery fragments were not so abundant as at their present place in South Orillia. This was Jacob Powley's homestead in former years, and many surface pits (*i.e.*, empty caches, or, perhaps, single graves) were to be seen at that period.

v.

On the east half of lot 1, concession 2. R. J. S. Drinkwater. His father, the late Capt. John Drinkwater, settled here in 1832. They have found many iron tomahawks, arrowheads, and stone axes on this farm, and north of Mr. Drinkwater's house some pottery fragments, showing occupation. Mr. Drinkwater has been very observant in matters of this kind; but although he has found numerous relics he has given them all away without making a collection of his own. This locality was once a favorite place for beavers, especially on a small stream running into North River here. The place is surrounded by streams, and thus somewhat protected as the site for a village.

vi.

On the east half of lot 2, concession 4. Before the year 1870, Edward Turner discovered a bone-pit here, near the camps. He was following a path through the woods when he noticed a depression in the ground, and having seen such burial places before, he resolved to dig into it. On doing this, he found the deposit of human bones. He also found in the pit five brass kettles, one of which contained the moccasined toes of a squaw, which had been preserved by the copper oxide, but this relic decomposed when exposed to the air. According to Mr. Turner's description of the pit, it contained hundreds of skeletons. The soil is very sandy at the place. The pit is half way west in lot 2, and on a low ridge along the crest of which the above-mentioned path followed. F. W. Fraser, of Toronto, who took part in the opening of this pit in or about the year 1885, was the first person to give me information of it. There were various single graves found around the large bone-pit. In one of the isolated graves there were three skulls, one of which was supposed to be that of a European person, though with what certainty of proof I have been unable to find. Altogether there were some thirteen kettles found in the pit, and some wampum. In the single graves were found a clay pipe, a stone pipe and an iron tool.

vii.

On the east half of lot 1, concession 4. John Ego. This lot was formerly occupied by the late Thomas Campbell. Some years ago, a large bone-pit was found on the south-east face of a hill, about half a mile west of Silver Creek. It was dug out at the time. Mr. J. H. Hammond, of Orillia, who gave me the particulars of this pit, also informed me that the soil at the place is sandy, and would be easy for the aborigines to dig with their roughly-made wooden tools.

viii.

On the southwest quarter of lot 2, concession 5. Archibald Fyfe. This site is on the northwest side of Silver Creek, and close to it. Soil, sandy. It occupies a hillside. Mr. Fyfe has found numerous remains here, including stone axes, clay pipes, beads, etc.

ix.

On the south-west quarter of lot 1, concession 5. Geo. Greer (who lives upon east half lot 2). The site is upon a sandy plain, on the north side of Silver Creek. Iron tomahawks were found at or near this site, and Wm. Rouse, junr., of Mitchell Square, found a clay pipe of the "pinched-face" pattern, which is distinctively Huron or Tobacco Nation form, belonging to the early French period or earlier. Mr. Rouse also found a part of the blade of a rapier. Mr. Greer has found, besides iron tomahawks, a steel knife, flat wampum beads, pottery disk and clay pipe bowls (Huron forms). There are or were some artificial depressions in the surface of the ground at this site.

x.

On the west half of lot 3, concession 6. William S. Brennan. On the ridge at the rear of the dwelling house, considerable quantities of pottery fragments and other remains are found. The pottery here was highly decorated. Mr. Armson, a relative of Mr. Brennan, while once excavating for the foundation of the house, found a large bone pit almost underneath the front door.

xi.

On the west half of lot 5, concession 8. Robert W. Holmes. This site is a patch on the summit or brow of the Algonkin shoreline and consisted of ash-beds, with pottery fragments, some brass arrowheads, etc. It had a defensive position. Mr. Holmes has found iron tomahawks (French make) by dozens, and these are also to be found on other farms about here.

xii.

On the east half of lot 6, concession 9. Charles Brailey. This site is near a small stream, and is in a line with the east end of "The Ridge" and a nice cove or bay of Lake Couchiching, the head of which is at the end of the eleventh line. The camps are about three-quarters of a mile from Lake Couchiching. There were ash-beds and empty caches or surface pits. In the ash-beds they found, in former years more frequently than in late years, brass arrowheads, bone needles, clam shells, etc.; and in the vicinity, iron tomahawks (French pattern) and stone skinners.*

* As elsewhere pointed out these were axes.

CATALOGUE OF SITES—SOUTH ORILLIA.

i.

On the south half of lot 1, concession 1. Henry W. Smith. Here was once the Indian Agency on the Coldwater Road, and at an early date a clearing had been made in connection with it, in which the Indians grew corn. Remains of this have been found. A site of the early Huron period also, yielding some relics of various kinds —stone axes, pottery fragments, etc.—has been found half way east in this farm, but no iron relics. A human skeleton was found at the place. This site extends a little way into lot 2 (Chas. H. Moffatt's), but is a distinct site from the one at Mr. Moffatt's house and at some distance from it.

ii.

In the west half of lot 2, concession 1. Frank Nelson. Some camps occur at a place on this farm, at or near the boundary of Mr. Goss' land (lot 3). Pottery fragments were abundant, and human face pipes in considerable numbers were found in the refuse many years ago, before the place had been much cultivated.

iii.

On the northeast quarter of lot 2, concession 1. Charles H. Moffatt. (Mrs. Nelson also occupies part of this lot). An important village site occurs in the extreme north-east corner of the lot, covering five or six acres. It includes Mr. Moffatt's garden and extends beyond it, crossing the boundary into lot 1. It also extends across the road here second line) into the lots of the second concession. There is a small stream through the adjoining lot 1, and the Indian remains have been found along the south side of the stream. The Indian cabins were placed along the banks of the stream, chiefly, the village being thus long and narrow and accordingly not palisaded. As no iron or other European relics have been found at this site, it probably belonged to an earlier period than that in which there was a misunderstanding with the Iroquois, and hence, there was no great need of palisading. There are numerous refuse heaps here, one of them being two feet thick, and showing that the place was occupied for a long time. Mr. Moffatt has lived here since 1900, and as this village site is near the house, his family has paid close attention to the numerous articles that have turned up from time to time. Bone needles and awls were uncommonly plentiful, some twenty having been found. Other articles were:—Wampum beads (bone and stone, but no shell wampum), a dozen stone axes, clam shell fragments, bears' teeth (some of them with holes for suspension as bangles), teeth of beavers and porcupines, thirty or more stone and pottery disks, many flints, a bone arrowhead, corn grains, etc. The pottery fragments found here are highly decorated, one of the pieces showing a human face as part of its decorations. The pipe fragments of this site well repay a careful study. The clay specimens show an uncommon development of the pictorial art, perhaps not even so much as a single plain pipe having been found, but all being decorated. Here is a partial list of some of the pipes:—Human effigy pipes in

considerable numbers, several of the cornet or flared-mouth pattern, a square mouth specimen (modification of the cornet pattern), numerous specimens of the belt pattern (one of them showing a modification of the basal line of dots into dashes), an effigy pipe (the bowl being the open mouth of a snake, similar to the figure in First Archæological Report, p. 23). The fragments of stone pipes found show also attempts at animal and human designs. At some little distance from this site a bone-pit was once found. It probably belonged to this site, although it is unsafe to conclude definitely, because there are other sites within moderate distances of the pit. In 1892, or thereabout, Mr. T. F. Milne, who then taught the Marchmont school, made some little examination of this pit, but found no remains of any importance. There were no whole skulls, and the other bones were saturated with water or otherwise decayed. Altogether, the information gleaned from this pit has been too insignificant to add much to our knowledge; yet, the pit may have been opened many years ago, as the late Wm. Smith, who lived on the next farm north (father of the present occupant, Henry W. Smith), was aware of its existence.

iv.

At the extreme south-west corner of lot 3, concession 2, beside Bass Lake. William Jackson. On a terrace in Mr. Jackson's field the usual pottery fragments and other relics are found. Gouges and arrowheads were numerous. Also on the higher hill eastward, some remains appeared. Beside the road, which passes along the shore of Bass Lake here, some of the immense boulders have mortars on their tops. No iron, or other relics of European make, are reported for this site, although some are said to have been found in one of the bone-pits. Part of this site occurs over the line of the adjoining farm, viz., the west half of lot 4, now occupied by Julius Crockford. In the latter farm, ther was a large hole in the clay hill, supposed to be the place where the clay for pottery was obtained, as pottery fragments were numerous round about. This hole, the late Richard Rix, who formerly occupied the farm, filled in when he found it. George Rix, now of Orillia Town, formerly occupied the farm of Mr. Jackson. On the same farm, some distance north from the easterly end of Bass Lake, R. J. S. Drinkwater discovered a bone-pit when the place was in the woods. The date of finding this pit was September 8, 1868, as Mr. Drinkwater finds by his diary, which he was kind enough to look up at my request. His knowledge of the surface indications of such pits he had obtained from his grandfather, the Rev. Geo. Halen, of Penetanguishene. A year or two later, while a camp-meeting was in progress beside Bass Lake, some of those who attended the meeting dug out the contents of the bone-pit, which Mr. Drinkwater had left undisturbed. Its position was near the Coldwater Road. The late Capt. Peter Lyon, who saw it at that time, informed me that it had a diameter of about twelve feet. Some brass kettles, clay pipes, etc., are reported to have been found in it. When the curiosity-seekers dug out this bone-pit, at the time of the camp meeting, a doctor who was present put together the bones of a skeleton for the edification of the spectators, thus combining anatomical recreation with divinity. A second and smaller bone-pit was found near the larger one.

v.

On the west half of lot 5, concession 1. The Basil R. Rowe homestead, now occupied by Chas. H. Rowe. The site is on the lower ground near Bass Lake, and extends across two fields. Pottery fragments, pipes, etc., were found at it, especially a number of years ago. Many stone skinners,* and French (iron) tomahawks, have been found all over the adjoining fields. Dr. Tache got some of the relics from this site when he carried on his archæological explorations some forty years ago, and these are probably in the Laval Museum in Quebec City.

vi.

On the west half of lot 1, concession 4. Edward Turner. He has found a few relics of the usual kinds, but the village was small. Iron tomahawks have been found in the neighborhood of this site, but none immediately at the place itself.

vii.

On the east half of lot 1, concession 4. Richard Vanderburg, sr. This place is situated on the east side of a part of Silver Creek, one of the branches of the North River. There have been extensive ash-beds and refuse heaps, mixed with clay pottery and pipe fragments, but the ground is all cultivated now. Archibald Fyfe, of North Orillia, once owned this farm and lived on it for a length of time. He found various relics while here. Edward Turner, now owner of the west half, also cultivated this land and observed the remains. Iron tomahawks have been found in the neighborhood of this site.

viii.

On the west half of lot 1, concession 6. Mrs. Emma McPhie and family, who occupy this land, find in their field south of the residence an important village site, the distance being not far to Mud Lake which is also partly on their land. The late Alex. McPhie found many relics here, including a few iron tomahawks; and his brother, J. W. McPhie, now of Epworth, B. C., also made a collection at this site. These were purchased in 1884, by Mr. George W. Dryden, of Whitby, Ont., in whose possession they are still preserved. In reply to my enquiries, Mr. Dryden informs me the collection he obtained from the McPhie brothers contains ten or twelve pipeheads (clay) some of which represent the following:—Wolf, owl, snake, frog and human faces. There are also some half-dozen iron axes, beads, wampum, bone needles, stone disks, etc. Mrs. McPhie's sons are close observers of this village site, at which there are numerous deep ash heaps. It extends into the land of Mr. Jesse Ryerson (west half of lot 2). It is worthy of note, that arrowheads made from pieces of brass (probably pieces of old kettles) are quite numerous here, and some of them were very neatly formed. Stone and pottery disks were numerous.

ix.

On lot 1, concession 7. George Annis. This lot is broken by Lake Couchiching, at the shore of which high terraces of former lake

* See foot note p. 110.

margins appear. On one of these terraces, Mr. Annis has found pottery fragments, pipes, iron tomahawks, etc. There is higher ground beside the site, so it was evidently not palisaded. The occupants of other farms adjoining this one have found stone and iron axes on their lands, showing this was a rendezvous in early times, as indeed we might expect from the fact that there is a cove in the shore of Lake Couchiching at this place.

x.

On Chief's Island, Lake Couchiching, a few remains have been found. This island has been a rendezvous for Algonkins, both ancient and modern. After the exchange of the Coldwater Tract for the Rama Reserve in 1839, the island became the headquarters of the Chippewas for a time, as its name implies. Relics from an islands in Lake Couchiching. T. W. Harris." (Compare these relics of the University of Toronto, marked thus:—"169, Two large circular silver brooches, one small brooch, three silver buckles, two horn spoons, two small hawk bells, etc., from a grave on one of the islands in Lake Couchichin. T. W. Harris." (Compare these relics with those from Present Island. Report on Tiny, p. 21). See also Sir Daniel Wilson's article on "Cranial Types" in *Canadian Journal*, second series, vol. 2, (1857), pp. 406-435, for measurements of Chippewa skulls from Lake Couchiching.

Some reefs on Cedar Island, in Lake Couchiching, are sometimes miscalled the old "Indian Fort" by a few people, but they are the work of the ice of the lake at a former higher level.

xi.

On the east half of lot 9, concession 1. William Harvie. Many camps, where ash-beds were as much as four feet thick, were to be seen here, strewn with pottery fragments, pipe fragments, etc. Iron tomahawks (early French make) and other relics have been found. The site covers three or four acres, and is on the opposite side of the valley of the same stream as the next site, and upward of a quarter of a mile from it.

xii.

On the west half of lot 10, concession 1. David T. Strathearn. Mr. Strathearn, sr., found pottery fragments and other relics at a place near a water supply, as long ago as 1859, or earlier. At later dates, also, other camps strewn with pottery fragments, etc., have come to light on the farm. The relics gathered included two steel knives. About 1888, Mr. Strathearn found a large mealing stone here (or at the next site), but unfortunately it was broken in removal. Three large ash heaps, or possibly more, are still quite distinct, notwithstanding the effects of cultivation.

xiii.

On the west half of lot 13, concession 1. This site is on the north bank of Brough's Creek, beside what was known as Edmonson's or Salter's Mill Pond. (This mill pond was broken down by

the flood of June 5th, 1890, and has not been rebuilt). Before 1889, when I first became acquainted with the site, it had been ploughed two or three times, and remains of camps exposed, strewn with pottery and pipe fragments, and other relics, including iron tomahawks. At that time the occupant was Richard Frost.

xiv.

On the north-west quarter of lot 10, concession 3. Thomas Day. Near a stream which flows into Shingle Bay. John Sanvidge, now of Magnetawan, lived formerly on the part of this farm on which were remains. During the time he lived here, copper kettles or pieces of them were found abundantly, also iron axes of early French make. Geo. McKinnell, of Orillia Town, obtained twelve of these French axes from this site. Two of them are now preserved in the Grierson Museum, in Thornhill, Dumfriesshire, Scotland. Richard O. Bell, Oro Station, obtained two French axes here on which the triple marks were unusually well defined and large, each tomahawk having a distinct pattern. Large ash heaps, mixed with broken pottery, pipeheads, etc., occur here. Mr. J. H. Hammond, Orillia, giving his recollections of the place in the early seventies, says: "It was on the south side of Barrie road, about a mile and a half out of Orillia, on the edge of the old mill pond between the road and the mill pond. This plot or site would be two or three acres in extent, and it was on sandy soil. In the field where the village site was, a great many remains of the Indians, such as broken pottery, pipes and broken pipe heads, skinning stones and quantities of ash heaps and remains of fires were scattered over the ground. The pipes were ornamented by a sort of basket-work pattern around the head of the pipe and near the top. Some of the pipes had stems, others only the pipe head with a hole for a stem. The skinning stones were all of a green stone, different from any around here, and were all chisel-edged. I recollect two grooved stones. These had a chisel edge and were large, about nine inches long, a half to three-quarters of an inch thick, and about three inches wide with a depression around the centre, apparently for the purpose of holding the handle. The soil of this village site is red sand, and it is on a level bench, about twelve feet above the level of the water of the dam." (The dam in the stream here is known as Thomson's Mill Pond, and formerly as Dallas', from Fred. Dallas, the earliest settler at the place). About three hundred yards to the west of the village site is the cemetery, with which it was probably connected. This burial-ground consisted of single graves, situated on the Cuppage farm (north-east quarter of lot 10, concession 2). Nearly all, or quite all, of the graves have been rifled of their contents by curiosity seekers. From all that can be learned, I regard it as a noteworthy archæological feature. In company with Dr. Jas. N. Harvie, of Orillia, I made a visit of inspection to this aboriginal cemetery on June 24, 1889. A tiny stream, emptying into the larger stream, divided the burial-ground into two parts. About thirty holes in the surface of the ground (presumably graves) were to be seen on one side, and about ten on the other. A tree whose stump showed about 115 annual rings, and had been fifteen years chopped, had grown out of one of

the holes, thus showing a minimum age of 130 years for the cemetery. Yet, this is much less than the actual age of the graves, as some French tomahawks furnish evidence that they were much older, and belonged to the seventeenth century. The ground at the place is sandy, while surrounding parts are clay and gravel. A little west (not above a quarter of a mile) and slightly higher, is the Algonkin raised shore-line. The surface of each grave was depressed below the level of the ground by sinkage, probably; and thus each grave could be seen. It is now close to Thomson's Mill Pond, but at the time of its use by the Indians it would be at the edge of a swamp. It resembles the Coleman cemetery in Oro (No. 41), and belongs to the type peculiar to the early Algonkins, and perhaps, also, to the Arendarronons, the Huron tribe, who were nearest the Algonkins, and were most influenced by their customs. The graves are said to have yielded a few pipes, (chiefly clay), tomahawks (stone and iron), pottery fragments and stone disks.

XV.

The Mount Slaven Site.

Indian remains have been found quite extensively in what is known as the Mount Slaven Annex. This is really a part of Orillia Town, but the land is not yet within the corporation limits. On both sides of the Mount Slaven Creek numerous remains have been found. For the most part, the plot in question is a large burial-ground. Whether it was the regular camping ground of the Indians who buried so extensively here, or whether their camps were at some little distance, is not very evident. But is certain that many ash-beds, mixed with the usual pottery fragments, etc., occur here as well as graves, and the probability is that the aboriginal occupants lived right here and buried their friends close to their dwellings. The remains have been found within the space enclosed by the Fourth Line of South Orillia and O'Brien Street on the west and east respectively, and by Mississaga and Lavicount Streets on the south and north respectively. Within this rectangular block is enclosed a space of about 68 acres. Graves and other remains cover about half of this area, which is now partly covered with houses and gardens. Placed as it was on lower ground than anywhere else around it, and occupying both sides of the creek, the sheltered position of this site would make it a desirable wintering spot; and I incline to think it was used for this purpose for a long period. The mixed character of the relics found here tends to confirm this view. For example, French iron axes of the pattern belonging to the seventeenth century, as well as pipe-tomahawks (steel) have been found on the site. The latter are not found on early sites, but occur on recent camping grounds; and they are to be regarded as belonging, not to the French period of Canada, but to the early British period, that is, after 1759. It is probable this camping ground was used in both periods. The settlers in the Mount Slaven suburb find many iron and steel tomahawks of both the aforementioned kinds.

Besides the series of isolated or single graves, which have been thoroughly ransacked for relics by curiosity seekers during the past

forty years, there were at least two communal ossuaries or bone-pits. The first of these was found about the year 1870, on or about lot No. 212, south of Mary Street, and thirty or forty yards from the creek before-mentioned. Very few buildings were in that part of the town at the time. A pine tree had partly grown over the pit. A large number of skulls and other human bones were found in it.

A smaller communal grave came to light in September, 1902. Mr. Harry Willey was levelling up his lot on the north side of Mary Street, and came across a number of skeletons, ten of which were together, the skulls occupying the small space of two square yards. Particulars of the discovery appeared, at some length, in the *Orillia Packet*, of October 2, 1902. The character of the deposit of bones indicates that the communal idea underlay the placing of them together. At a former time some beads and tomahawks were found with a few other skeletons some yards nearer the street; and again, in August, 1903, Mr. Willey found an earthern pot (Indian make, complete) beside some other skeletons.

As to the question of what kind of Indians inhabited this site, Mr. C. A. Hirschfelder once informed me that he made openings in a few of the single graves some years ago, and obtained some European relics. He concluded that the burials he saw had been of later Algonkin origin. On the other hand, Mr. Lawrence Heyden, Toronto, stated to me his opinion that this was a Huron site, giving as his reason the occurrence of a communal grave, out of which he took no less than 38 tibiæ (shin bones). This implies that the communal bone-pit was a Huron institution only. Perhaps both gentlemen are correct in holding these divergent opinions, as I have mentioned above, the probability that the site was occupied by Indians in widely different periods. Mr. Heyden communicated to me some facts bearing upon these burials, as follows:—

"The ossuary or rather series of ossuaries found about quarter of a mile west of the Orillia Town Hall, contained copper kettles, remains of blades of knives, pipes, pottery as well as stone beads, etc. So any village in the vicinity of these ossuaries must have been populous and post French (that is, after the French arrived in the country, and not after they had quitted the district, when the Hurons dispersed). Hatchets and other remains are frequently found scattered within a pretty large circumference of which these ossuaries might be taken as a centre."

Some persons have advanced the theory that this site was Cahiague, the town from which Champlain set out in 1615 on his expedition to the Iroquois. The characters of this site forbid the theory, even if we had not Champlain's explicit statement, that Cahiague was three leagues from Lake Couchiching. In the first place, the relics found here indicate that the site was inhabited at widely different times, which would account for the large extent of ground strewn with remains. Yet, large as the site is, it is doubtful whether it could be the spot on which the 200 cabins of Cahiague were placed. And still further, it lacks a defensive position, which was essential for a large village or town like Cahiague. It occupies flat land, with higher ground on two sides of it, and is on both sides of the creek. A position of this kind was anything but defensive, according to our knowledge of what other fortified village are like in the matter of

position. The site was probably Algonkin, both early and modern, and not Huron.

While preparing these descriptions of sites, I was favored by Mr. J. H. Hammond, of Orillia, with the perusal of some notes on this site, written by him to preserve some record of the place, as its present condition scarcely admits of making a definite account, owing to the presence of so many buildings. Mr. Hammond has granted my request to publish the following extracts, a favor that will be appreciated by students of archæology and history generally, as there are but few left who witnesed the exhumation of the most important part of the remains about thirty years ago. Mr. Hammond, whose remarks on the orientation of the burials, and other mortuary practices of the Indians who deposited the remains of their dead here, are very interesting, says—"In the early seventies, as a schoolboy, I spent the greater part of some Saturdays and holidays with my playmates in excavating Indian graves on the lots north of the extension of Mississaga Street, on Mount Slaven, near Orillia Town. Our schoolmaster (Samuel McIlvaine) urged us to make all available collections of any objects such as beads, wampum and the like. He was making a collection, and utilized our muscles in furthering that object. It was then called the Indian graveyard. These excursions lasted over three years, and were pursued by us every convenient Saturday during the summer seasons.

"The graves were single and extended in (four) lines from the bank of the creek toward the hillside at the Coldwater Road, in a north-westerly direction. All of the bodies were buried in a sitting posture, facing the east or morning sun. In every case we came on the skull first. The hands and arms were always in front of and crossing the leg bones.

"In only one case were there more than one body in a single hole. In this case the bodies were laid flat, head and feet regularly. This hole was oval, about fifteen feet long and seven or eight feet wide, and placed between the second and third lines of graves, twenty or thirty yards from the bank of the creek. In this big grave we found a large quantity of wampum about the size of a ten cent piece, with a drilled hole in the centre of each piece; some round blue beads: and some red beads of a bugle shape, an inch to an inch and a half long, pierced like the others. Also, a quantity of flint arrowheads and spear heads. No iron axes that I remember, though we had plenty of them from the neighborhood.

"In only one case was any kettle found, and this was south-east of the big grave, on a level place about half way down to the water edge. It was upside down and under it was a quantity of thigh bones, which were in no case broken. These had been boiled or were in the process of being boiled when the kettle was upset and the fire put out by the liquid in the pot. On top of this pot a big pine stub was standing, and the main root of the stub ran down in the earth until it reached the bottom of the kettle, and then grew around the surface of it. This stub would be at least two feet through, and we had to cut through the big root to free the kettle before we could get it out of the hole. Underneath the kettle and bones, as above described, were the remains of the fire, some of the wood partly burnt, some burnt to coal and some to ashes. This kettle was brass, and had

holes for the bail. The rim was flared, and was of the same material as the pot itself. It was about two and a half feet across the top and about twenty inches deep. The bail holes were about an inch and a half in diameter, and about half an inch from the edge of the pot. Inside of the pot was a collection of green matter, hard and sticking fast on the pot when we found it. The surfaces of the bones were of a brown yellow color; no marks upon them. Underneath the kettle the ashes were bright and clean; no trace of any rotted flesh, only pieces of charred wood and coal and ashes underneath the bones.

"The graves were in a succession of lines about twenty feet apart each way, and apparently followed a fixed plan of burial. There were, at least, four lines of graves, (possibly more), and they extended through the sand (a coarse grey and well-drained sand) to the gravel under the hill at the Coldwater Road. The ground was nearly level, having a slight upward trend toward the Coldwater Road or Trail, a distance of a quarter of a mile or more. The ground had at one time been cleared of trees, for the trees were nearly all of one size, viz., about a foot through, while the woods on both sides of the graveyard were larger and contained pine trees, some large, others smaller. There were a few butternut trees along the edges of the graveyard, but none on it. The spring creek, which ran to the east and south had cut a channel from fifteen to twenty feet deep below the level of the graveyard, and it was at this time a running stream all the year round.

"One of the graves that we excavated was of an exceptional character, as the bones were of an enormous size. The skull was intact, with the exception of a break in the middle of the crown. This was two or three inches long, and about half an inch wide, apparently made by a blow with a blunt axe or pointed stone. The cut ran from the back toward the front of the skull, and was widest at the middle of the cut tapering to a point both ways. The lower jawbone of this body was in place, and I tried it over my own head and face, and it passed clear of my face, without touching it at any place. Our schoolmaster measured the thighbone of this body on his own leg, and it extended beyond his knee several inches, and he was a tall man, too. We found in this grave a quantity of hair, black and long, apparently attached to what we then thought to be a scalp. This was on the knees of the body. I also got out of this grave a black amulet shaped like a bird, which had apparently hung on the breast of the man in life. It was of stone, polished and perfect. We also got some flint arrowheads out of this grave, but nothing else that I can recollect."

xvi.

On the west half of lot 6, concession 5. In the north and highest part of the Town of Orillia, numerous remains have been found along the brow of the Algonquin shoreline. The relics found on this high ground site belong more distinctly to the early Huron period than do those of the Mount Slaven site. The Huron forest trail appears to have passed along the brow of the ridge here. The following list of some of the remains found is only a partial one:—In

the woods on a lot belonging to Lawrence Heyden, Toronto, east of the upper end of Peter Street, partly within the town limits, there were found several hatchets. At another place in the vicinity of the same, numerous pottery fragments were found, at a short distance from a spring, as Mr. C. H. Hale informs us. On a lot on Matchedash Street, sold by Lawrence Heyden to the Rev. Mr. Creighton, there were found, on clearing off the surface stones, a human skeleton with a hatchet (French, of the early Huron period) lying beside it. In the spring of 1903, F. Webber, lot 25, North Borland Street, found a string of wampum (55 beads) while digging a celery trench in his garden. C. E. C. Newton, Esq., found in his garden on Borland Street, near the High School, in August, 1903, a fine brass crucifix, 5 inches long and well preserved. In the *Orillia Packet*, of July 16, 1903, A. C. Osborne describes a St. Bartholomew medal, bearing the date August 24, 1572, which W. J. Powley found near where the Coldwater Road ascends the ridge. All these finds, and many other similar ones, in the highest part of the town, indicate an extensive occupation and travel here, in the early period.

xvii.

On the old Asylum ground, now the Park, in the Town of Orillia (parts of lots 7 and 8, concession 5). This was a prehistoric site or landing, as well as a noted camping-ground for Indians as late as the time when the first settlers came to Orillia. Iron hatchets have been, and are being turned up.

xviii.

On the west half of lot 21, concession 1. William Anderson. Members of Mr. Anderson's family have found stone axes, clay pipes, pottery fragments, an iron tomahawk, etc., at a place near their boat-house. One of the pipes was of the belt pattern, an early Huron type. The site is at the west end of the portage across the neck of land at Carthew's Bay. The Indians use this portage to the present day, the trail passing across the neck on the north side of the swale which occurs there. Modern Indians carry their canoes across this neck of about 25 rods, rather than paddle round the point (Eight Mile Point), a distance of more than a mile around, and also exposed to winds. The evidence at hand also shows that Indians at a very early period preferred to do the same.

Local newspapers of June, 1888, mentioned the finding of a human skeleton (supposed to be an Indian's) with coins of about the year 1800, at what was called Cameron's Point, two miles to the eastward of this portage. The action of the waves had washed the skeleton partly out of the bank where it had been buried. It proved, however, to be the remains of an old trader, who carried on his traffic among the Indians at an early date. When he died they buried him in his old butternut canoe. There were brass buttons on his coat by which the remains were identified.

xix.

In the central part of lot 12, concession 3. Now the grounds of the Provincial Asylum for Idiots, near Orillia Town. The position

of the place is at the north-west part of Shingle Bay, where the land rises high above the lake level. There was a landing here in the time of the aborigines. The late John Burkitt lived here in former years and found numerous relics, especially many pottery fragments, etc. Mr. Burkitt's name appears in early Assessment Rolls (1858 and later) as owner of the whole of lot 12. And Mr. C. H. Hale informs me this was known as Burkitt's farm after 1868.

xx.

On part of lot 11, concession 6. F. S. Smith. Numerous relics have been found on his farm, which is on the shore of Monk's or Smith's Bay. A favorite landing-place of the Indians existed here from early times. Metal tomahawks have been found, indicating the occupation of the place during historic times; but there have been also relics found of prehistoric dates. Several years ago, on the narrow tract of land between the two lakes (Simcoe and Couchiching) many stone axes were found. The place was near the Atherly Road, on the way to Invermara, and also near the bay just mentioned.

xxi.

At Invermara, in the grounds of Orchard Point House (summer resort), formerly the Red Cross Hospital, which is the property of Mr. J. P. Secord, Orillia. A paragraph appeared in each of the three Orillia newspapers of May 1, 1890, mentioning the finding of a human skeleton, with accompanying Indian relics, and also other articles in the vicinity of the find. There were numerous prehistoric as well as recent relics, the remains thus belonging to all periods from the earliest downwards. Beside the single skeleton (apparently a woman's) there were some stamped out metal ornaments; three brooches, a double-barred silver cross, about four inches long, with "Montreal" and the maker's mark upon it. At a little distance away were found fragments of roughly ornamented pottery, clay pipe heads, stone axes, a bone disk, etc. The relics found with the skeleton indicated that it belonged to a comparatively recent period; but the clay pipe-heads and fragments mostly belonged to the early Huron period. The latter included a Huron flared pipe (plain), six belt pattern pipes, and five images from pipes (an owl's head, a hawk's head, the head of another bird, a nondescript image, pig-nosed or wolf-nosed, and a human face). The foregoing relics indicate various periods of occupation of the site, as we might expect from the fact that the fishing station at a little distance north, and, in fact, along the entire length of the Narrows, attracted Indians thither at all times.

xxii.

Fishing Station at the Narrows.

Remains of the fishing station and fish weir of the Hurons at the Narrows. The position of the old weir is north of the present bridges and south of the old railway bridge. In 1887, the late Joseph Wallace, sr., a local archæologist, of Orillia, identified this as the fishing station mentioned in Champlain's Journal (1615), at

the time when he had extracts from that Journal printed in the *Orillia Times*. (See Champlain's Works, Vol. 4, page 34). Mr. Wallace also contributed an article on the subject to *The Canadian Indian* (Sault Ste. Marie, Ont.), and it appeared in the issue of that periodical for February, 1891, pages 134-138, under the heading "A Fishing Station of the Ancient Hurons Identified." Owing to the rarity of that publication, it is worth while reprinting here Mr. Wallace's words in reference to the fish stakes. After some general remarks on the object of Champlain's expedition, he says:—

"The Narrows presents much the same features as in Champlain's days. But its fame as a fishing ground has long vanished; bass may still be caught with the rod, or trolling; and in the winter season, some scores of Indians and whites may be seen spearing herrings through holes cut in the ice. Still, there is no doubt that at the time to which reference is made, all those lakes were literally swarming with fish. Are there any remains to point out the exact locality where these stakes crossed the strait? In answering this question in the affirmative, I would state that some years since, my friend, Gilbert Williams, an Indian, informed me that he had seen very old stakes, which were used by the Mohawks for catching fish. Some time after, when I was writing out the story of Champlain for one of our local papers, I was conversing with Charles Jacobs on the subject, who said he had also seen the stakes, and further, that the locality was known to this day as "mitchekun," which means a fence, or place which was fenced or staked across. He said that if a strange Indian were to ask him where he came from, he would answer, "mitchekuning," the termination "ing" signifying "from," that is, from Mitchekun. We were, at the time, standing on the Orillia wharf, and within sight of the end of the Narrows. Charles Jacobs said, ask old Mr. Snake (who was standing near by,) where Mitchekun is. As soon as I asked the old man he turned and pointed to the Narrows, which was between two and three miles distant. In September, 1886, I walked down to the Narrows, and entered into conversation with Mr. Frank Gaudaur, who is of Indian extraction, and the keeper of the Midland Railway Bridge, who immediately took me to the side of the bridge, and only a few paces distant, and showed me a number of the stakes which remained. Dredging the channel for the purpose of navigation had, of course, removed the greater part of them, only those on the outside of the dredged portion being left. Mr. Gaudaur said that there were some other places where stakes might be seen, but that this was the most complete part. The stakes, as might be expected, were a good deal twisted by the current, but the ends were still close together, and firmly embedded in the clay and mud at the bottom, so that it was only after considerable pulling with a spear, that one was brought to the surface. The stakes would be about five or six feet long, and thicker than a walking-stick. It is to be observed that they are not placed across in a straight line; indeed, one portion is continued in a direction half-way down the stream, and would thus produce an angle when the line was changed upwards, and at the opening of this angle would be placed the net; and this is in exact accordance with the method which Champlain describes, when the Indians were hunting deer; that is by staking out a large space in the woods, with an angle

into which the game was driven. It is not difficult to account for the stakes lasting for so many years when we consider that the tops were under the surface of the water, thus escaping the action of the air, and also that of the ice, which in this locality is never of great thickness because of the rapidity of the current. It must be understood that we do not assert that these identical stakes existed there in Champlain's time, although it is possible that some of them may be part of the original construction. It was probably used for fishing purposes long after the time of Champlain, and even after the destruction of the Hurons, for I am strongly inclined to suspect that a portion of the Mohawks settled down on the vanquished territory, and remained there a considerable time. If such was the case, the fence would be repaired from time to time, as circumstances required, without altering the site to any material extent. The stake which I had, had been pointed with an axe of considerable sharpness, as evidenced by the comparatively clean cuts made in the operation. Our present Indians, who are Ojibways, know nothing about them, except the tradition above mentioned. Mr. Snake is an old man, and he stated to me that the old Indians, when he was young, referred the whole construction, and its use, to the Mohawks. I have no doubt, if they are not molested, the remains will be in existence a century hence."

A paragraph in the *Orillia Packet* of June 21, 1889, affords some further information upon the important fishing station:—"During his stay here, Mr. A. C. Osborne, of Penetanguishene, accompanied by Mr. Joseph Wallace, sr., visited Mr. F. Gaudaur, and they made a most interesting discovery. A copy of Champlain's journal describes the method by which the Indians took fish in 1615. They had rows of stakes driven into the bottom of the Narrows, in such a way as to corral the fish in passing from one lake to the other. In this manner enough fish for the commissariat during the expedition in which they engaged against the Iroquois, were taken in five or six days. When this part of the journal was read to Mr. Gaudaur, he took his visitors to where the rows of stakes could be seen under water. The Ojibways, he said, found these stakes there when they came a hundred and fifty or eighty years since, knew what they were for, but did not use them. They were in large numbers, and at one time extended quite across the Narrows, but very many were thrown out in dredging the present channel. The stakes are of tamarac. Mr. Osborne secured two—one had evidently been put down to replace another at a date subsequent to the other, which was soft, like cheese, when pulled out. The top is desiccated, and is covered with slime. Though only some six inches were visible they extend a long distance into the mud. Mr. Osborne believes that the older stick is one of those there when Champlain encamped at the spot. Mr. Gaudaur says that these under-water "fences" probably suggested the Ojibway name of Orillia, or the Narrows—Michikaning: "The Place of the Fence."

Following the publication of the foregoing paragraph, the present writer communicated a letter to the *Orillia Packet* of July 5, 1889, suggesting that the early French name of Lake Simcoe, viz., Hurdle Lake, (Lac aux Claies), was derived from this fishing contrivance at the Narrows. C. C. James, M. A., made a similar suggestion in a letter to the *Toronto Globe*, May 26, 1896. And in a

letter to the *Orillia Packet* of April 2, 1903, Aubrey White, Deputy-Minister of Crown Lands, Toronto, also suggests, or rather points out as an established fact, (though without citing any authority,) that the early French adopted the idea of the name Hurdle Lake from the same Indian fish fence. These three suggestion appear to have been made independently of each other, making the validity of the suggestion very strong. [See also Gen. John S. Clark's article in Ontario Archæological Report for 1899, p. 195].

A. F. Hunter.

Barrie, December, 1903.

IROQUOIS IN THE NORTH WEST TERRITORIES.

In the last Report on Indian affairs issued by the Hon. Clifford Sifton, Minister of the Interior, Ottawa, a reference was made by Mr. James Gibbons, Indian Agent, at Edmonton, Alberta, to some natives known as Michel's Band, the original members of which were said to have come from Quebec. The statement was singular enough to arouse some curiosity, for although instances are known respecting the appearance of individual Indians, hundreds, or even thousands of miles away from their original homes, it is quite unusual for these people to move voluntarily, in a body, so far away as Alberta is from the Province of Quebec.

A letter of inquiry addressed to Mr. Gibbons, respecting the statement, brought a note from him to the effect that "the members of Michel's Band are the children and grand-children of two brothers Michel and Baptiste, who came originally from near Montreal" (probably from Caughnawaga) and, that as he was about to visit the band in a short time, he would try to procure more detailed information, and let me know the result. In accordance with this promise Mr. Gibbons has very kindly written the following interesting letter:

Indian Agent's Office,
Edmonton Agency, November 24th, 1903.

Dear Sir,—I am now able to give you some information relative to Michel's Band and their connection with the Iroquois Indians of Eastern Canada, about which you asked in your letter of July 24th last. Chief Michel Callihoo, now an old man of over seventy years, says his father came to this country at least a hundred years ago. He can remember his father saying, that his tribe lived across the river from Lachine. As he was speaking to me through an interpreter, this may be looked on as settling the locality of the band, this name of Lachine not being at all familiar here. The Iroquois name of his immediate family is Carr-e-heoo,* and is translated A Fine Forest. Some twenty-five years ago he met some of his tribes-

*I have submitted this word to the judgment of Mr. F. O. Loft, an educated Mohawk, in the Ontario Civil service. He agrees that the meaning of the word is correctly given, but suggests that the spelling should be Kal-he-yo, or Kar-he-yo, Gar-he-ho. In pronouncing the word there is a semi-guttural at the end of the first syllable, which Mr. Loft thinks is best represented by l. The usual difficulty occurs in this word as to k, and hard g, when pronounced by an Indian.

men from the East, who told him that many of his name were still there and that his cousin of that name was chief of the Wolf tribe of the band. The party who immigrated to this country consisted of about forty men, no women coming. They had learned, he said, that fur-bearing animals and game were abundant, probably from Hudson's Bay Company's people. Arriving here they appear to have connected themselves with one of the fur companies, of which he says there were three. In pursuing their calling they appear to have ventured out on the plains, an act of temerity that cost the lives of eighteen of their number at the hands of the Blackfeet who then ruled the plains. After this disaster, the majority appear to have gone up to the Jasper Pass country, and though I hear of them occasionally, they are outside my field of enquiry.

The father of Michel entered the service of the Hudson's Bay Company as a boatman, and in that calling made trips as far east as the Lake of the Woods. He married a French half-breed woman. I can only find that he and one brother left any descendants here. Thirteen families, numbering sixty-six individuals, can trace descent from one or other of these brothers, and, as no women came with the original immigrants, it is obvious that the Iroquois blood in this generation is attenuated to the vanishing point. They have lost their language, and if they retain any tribal characteristics they have become so feeble that the ordinary observer of Indian manners is unable to discern them. In appearance, habits and social status, they are undistinguishable from the half-breeds of the country.

This is the book of the Lost Tribes compiled by one unaccustomed to ethnological research or historical analysis, and, while it will not add much to the sum of your Indian lore, it may supply you with clues to prosecute a more satisfactory enquiry.

Yours truly,

JAS. GIBBONS.

THE KILLING OF MOOSTOOS THE WEHTIGOO.*

During the winter of 1898-9 a band of Cree trappers camped at Bald Hill, on Smoky River, about 75 miles west of Little Slave Lake. This band was under the leadership of Entominahoo, who, although not a "chief," was looked up to as a Medicine Man of considerable authority. Other members were Chuchachuck, Napaysoosee, Napaysis, Payoo, Moostoos or Louison, Mihkooshtikwahnis, Apishchikisaynis, Little Felix, Mikisyoo, Kunuksoos, with their families, all of whom were accommodated in two shacks, and four tepees.†

Towards the spring of 1899 several of the band became sick. One of these was Moostoos, who convinced himself and others that he was about to become a Wehtigoo, or, what is known among Algon-

*For the Court copy of the evidence from which the extracts are taken, thanks are due to Mr. John R. Boyle, of the firm of Taylor & Boyle, solicitors, etc., Edmonton, who very properly regarded the evidence elicited as likely to prove interesting to ethnological readers.

†Shacks, roughly built houses—tepees, wigwams or tents of cloth, or of skins.

quin tribes further east as a Wendigo,* or, Wentiko, which is to say, "one possessed." He declared that when the change came he would kill his children and "clean out" everybody else, unless his friends would first put an end to him. This they did, and what follow are extracts from the evidence given by the men and women of the band at the trials held at Fort Saskatchewan and Edmonton, Alberta, in connection with the case, which is, perhaps, unique in British jurisprudence.

Nothing presents more difficulty than the *extraction* of information on any subject, even with the assistance of a good interpreter, from Indians, so strong is the tendency on their part to offer such replies as the nature of the question seems to suggest to them.

The extracts being presented here as an ethnological, and to some extent, as a psychological contribution rather than as a lgeal one, they are not given in the order of presentation at the courts, and, for the same reason, by far the larger portion of the evidence is omitted.

The first court was held at Fort Saskatchewan, and the second at Edmonton, so that some of the witnesses were examined twice, but the variations as well as the agreements in their evidence, are not only interesting but edifying.

QUEEN vs. PAYOO AND NAPAYSOOSEE.

Called by Crown.

Eliza (Kunuksoo's wife), said:—

Last saw Moostoos near Bald Hills. Was not quite dead when I saw him. Do not know if anything was the matter with him. He was in a shack. Do not know if others were there. I was not well. I was in the shack when he first took sick. All at once he told the people that he was going to kill them all that night. People there were1, Entominahoo; 2, Kunuksoos; 3, wife of 1; 4, wife of 2. Don't know who else. Was too scared that Louison (Moostoos) was going to kill them. I am cousin of deceased. Payoo is my relation. Napaysoosee is my cousin. He (Moostoos) was moving all the time and a lot of them holding him down. He was lying down. Holding him were Napaysoosis, Chuckachuck, and I myself holding him by leg, and praying at same time. Mayaskwaysis holding other leg. He was trying to bite Napaysoosis. Payoo then struck him. I saw Payoo coming into the shack while we were holding him down. After Payoo struck him I went out. Struck him with an axe. Don't know what part of the body; was not looking. Saw him swinging the arms to strike. I did not hear anything said. Deceased said, "You will all die to-night if you don't kill me first." Don't know of him saying anything else. Don't know if he cried out when struck. Don't know how long Moostoos was sick. Don't know how old Moostoos was. Did not belong to the same band. Came from Sturgeon Lake. Napaysoosis used to be at Sturgeon Lake. Don't know where Payoo belonged.

ENTOMINAHOO said:—

I am not chief, but am recognized as head man. Deceased came in winter. Not sick when came. He was a fine man, and all of a sudden we took notice of something wrong with him. Just about the time this happened, he said, "there's going to be something wrong with me." He said, "If I go wrong you had better kill me so that I may not do anything to my children."

Then in the evening we saw that he was thinking something wrong about us. After he said that, he was moving about, and I took hold of his wrist to quiet him, and he threw me off like a child. In this form of sickness they struggle very hard. Got hold of him by one arm again to try and hold him and sat down beside him. Payoo was not in the house at the time. Napaysoosee and Chuckachuck wanted to hold him down by the shoulders. Then Payoo came in. I did not notice him come in. I was sitting close to his feet. Saw Payoo strike deceased with an axe. Don't know where he got it. Can't say where he struck him. I think in the head end of the body. Saw the axe falling but not actually strike. Saw it strike, but was dark in there and could not see just where it struck. Saw no blood. Moostoos nearly got up after the blow. After that Napaysoosee struck him on the breast with axe. Could not say which side, or whether in back or front, same axe. He was quiet then, and we all went out soon after and went to other house. Napaysoosee came running to house where I was about noon next day, and said "That man is moving—is rising up from the ground." I went there and saw. A blanket was over the body, and legs were all I saw, as he did not move: if he had, we would all have died of fright. Did not lift blanket. I saw Payoo tie deceased's legs to pickets and with trap chains the night of killing. It was not the chains that caused the swelling, but the evil that was in him. Left body there and came away, shutting the door. The whole party went to Lesser Slave Lake, think the same day, but not sure, and on the way met Corp. Phillips and reported matter to him. Napaysoosee and Chuckachuck went back to camp with Phillips. My wife, Eliza, and Felix's wife were there. Kunuksoos and wife not there. I was sitting much of the time with my back to deceased, and may have missed seeing what women did. I saw Eliza striking him with a cord. Did not see other women do anything. I did not hear deceased say anything while we were in there. I was afraid he was going to kill us. The reason I was afraid is, because we hear from all over often that a person like that cleans out the whole of the people, does not leave one. The man was going to be a Wehtigoo, look what he said about his own children. I never saw a Wehtigoo before, but that is what I have heard. We had nothing to tie up a man with. They say that a Wehtigoo is immensely strong.

MARIE, wife of Entominahoo:—

Was in shack, saw Payoo strike deceased with an axe. Chuckachuck struck him too with an axe. Napaysoosee too. Don't know if the women struck him. All struck him towards the head. Did not see where Payoo struck him. Payoo struck him. Chuckachuck next.

*This name is applied to the "spirit," as well as to the affected person.

When Chuckachuck struck, Napaysoosee was standing towards deceased legs at left side, far side from door, and was standing in same place when he himself struck. Moostoos said, "I'll make an end of you all to-night, if you don't kill me." Chuckachuck and Napaysoosee both holding him on left side, Eliza was towards the feet standing. Eliza whipped him. Could not say exactly how often, twice certainly on the breast, being then standing at his head. Did not see Felix's wife doing anything to him. It was Payoo killed him. Chuckachuck struck just once after Payoo. Napaysoosee struck some time after. Deceased stopped moving after Payoo struck him. Chuckachuck struck for nothing. I was so afraid I did not know whether I was alive or dead.

NAPAYSOOSEE said:—

It was on Smoky River, one day's march from Lesser Slave Lake where this occurred. Apart from deceased there were thirty-two people there, last March. Had been there all winter. Two small houses and four tepees. All were Crees. Deceased's (whiteman's) name was Louison, about 40 years old or a little under. He was a Beaver. He came there about the middle of winter from Sturgeon Lake, a little after the New Year. He spoke Cree. Always good friends with him. Louison's wife and children were with him there. I and other prisoner, Payoo, are both baptized Catholics. Some of the band were not. Those who were Catholics went to Lesser Slave Lake to church. Some were Pagans and did not. Moostoos had three children. Moostoos lived in a shack and his two brothers-in-law with him, both married, named Chuckachuck and Apishchikisaynis. Eash had one child. Three men, three women and six children in the house. We had no chief, but an old man named Entominahoo, "The Little Hunter" was looked upon as our leader, through the Hudson Bay Co. He was a Pagan.

About 5.30 one day Moostoos would not eat. It was not yet dark. He was acting differently from what he ever did before. He wanted always to see me and to be with me. At last he would not speak to me at all. He was excited and seemed to float above the earth. The last time he spoke to me, no one had done anything to him till then, and there was nothing to keep him down, he said to me, "This night all of you in this house are going to die." He had been getting worse all day long. I took hold of him with Chuckachuck and two women, and held him down. He tried to bite me in the arm, but only tore my clothes with his teeth. One of the squaws named Eliza held him by the leg. She took two cords from her girdle and struck him in the face with it. The other woman with a file stabbed him in the breast. His brother-in-law struck him in the face with a hatchet. When struck in the face by the woman, the blood came from his face. After being struck with the hatchet he did not move. I then took the hatchet and struck him in the right side, but not hard, and also with the knife in the bowels. After the woman struck him with the cord, he was breathing very hard, and then the blow of the hatchet broke in his head. The reason we struck him was because he had threatened to kill us all. It was to save our lives. We were all foolish with fear. Next day they told me to cut off his head or he would come back. I refused, but at last

I consented and said if you are not afraid of causing me to die when you force me to do that, and I did it. It was in the house where he was lying. A number were there and saw it done, but I alone did it. They told me to fasten his legs with a chain and I did so. We were all crazy with fear, and when we found out what we had done, we left the place and left him there. I drove a stake through the hole where I had struck him in the side with the hatchet.

Moostoos said at Sturgeon Lake he was going to turn Wehtigoo, and we had heard this and were afraid of him. It is our law to kill a Wehtigoo. Moostoos had said to his wife, "I am going to go Wehtigoo, I don't want to do anything to my children, it is better that they should kill me."

Napaysis being sick, the men all were sitting round Napaysis, and Moostoos was there. He was not then sick at all, and all at once he commenced to speak of all kinds of things. He looked all around and said, "How would it do, if I should eat the little ones, and especially their noses?"

Among our own band I never saw or knew of a Wehtigoo kill and eat any one, but I have heard of it often.

When Moostoos was bad sick, he floated up right off the ground, and when I caught hold of him, it was hard to reach up to seize him. He was very strong, and we had hard work to get him down and hold him down. He was a small man.

NAPAYSOOSEE said:—

Cannot understand why the others swear that Payoo struck the first blow. It is not true. Eliza ran a two-pointed iron instrument into Moostoos' leg the next morning, after he was killed. At the time she whipped him in the face, she had in her hand besides this cord, an axe. She was singing and calling out. Eliza struck him often over the face with the cord, and I saw the blood come through the blanket which was over him. I saw Eliza next morning burning the cord to ashes with which she had struck him. The one she showed in Court was not the same one at all. Mihkooshtikwahnis was making medicine and trying to make him well, but he could not manage him, he was too much for him and I sent him out of the shack. There were small sticks planted and the men and women were singing, making medicine all but me; I was not. We were all sitting there all night after he was killed. I took his head off with an axe on the next day. It was not daylight yet when Entominahoo's wife poured hot tea into his breast. Don't know who put stone in of which you say Payoo speaks. Don't know of it at all. Payoo and I helped another to drive in the stake. Entominahoo was the chief medicine man of the band. The tying of the legs to the stake was done by me and Entominahoo's wife. She tied one and I the other. This was before daylight. The tea was brought from the other shack in two small kettles. Think it was Entominahoo's wife who suggested it. All the day before I thought there must be ice in him to make him sick that way. I thought that if the ice was allowed to stay there, that the evil spirit could not be killed out, and I suggested the hot tea.

The other man, Napaysis, was going that way too, but he was sick weak, and it was not hard to subdue him, but we could not do

anything with Moostoos. I think it was Chuckachuck who called out "Come and see this here." Eliza handed the axe to Chuckachuck that he struck with, but she may have struck with it first, although I did not see it.

PAYOO:—Statement made May 6th and 15th.

I was in the shack sitting with the women, when they called to me, I went to the house where Moostoos was. As I entered they cried out to me, "Strike him first or you will die." I struck him with the hatchet too, but he was already dead. Napaysoosee told me to strike him with the knife too.

We poured the tea over him because his body was full of ice in the house.

When I was called, to go to strike Moostoos, his wife said to me "kill him thoroughly, for he will come to life." When I went in the people there were Napaysoosee, Chuckachuck, Kunuksoos, Kunuksoos' wife Kiakichihowasoo, Little Felix's wife Mayaskwaysis, Eliza wife of Mihkooshtikwanis, Entominahoo and his wife, and Apishchikisaynis, with a blanket over his head.

They are lying when they say I struck the first blow. They are all related to one another, and I am alone among them. When I went in the man was dead, and no one was holding him. A blanket was over him, and some were holding on to the corners of the blanket. Kunuksoos' wife was one of them. I did not notice blood on the blanket over his head, but an axe was sticking in the body, and a knife was planted in his body. It was Napaysoosee's knife. Next day I saw an axe with blood on it. and recognized it was Eliza's by the handle. I saw her take it and hide it. I saw Napaysoosee cut off the head with an axe the next day. Next day there was a hole in the body where the axe had been sticking, and Napaysoosee told me to hold the stake over the hole, and he struck it but it would not go down. Then Napaysoosee told me to hold on, and he took the stake made marks on it with charcoal, and used some medicine words which I did not understand, and when he struck it, it went right down through. Napaysoosee is a medicine man. Entominahoo and his wife, and Felix's wife were there too. The last thing was the cutting off of the head.

Napaysoosee, Chuckachuck, Entominahoo and Mihkooshtikwahnis were all medicine men, and they were conjuring, having small sticks planted in the ground beside him, and were conjuring and chanting for a long time inside, singing and drumming. Eliza was singing. Mihkooshtikwahnis failed to make medicine and they sent him out. The sticks were taken away next morning. Napaysoosee told me that when they were holding Moostoos down and trying to make him better by medicine, he threw Mihkooshtikwahnis to one side, and the other men sent him out saying his medicine was not strong enough. When Mihkooshtikwahnis came into the shack where I was, he told me that Moostoos's medicine was stronger than his, and added "He's going to eat me now."

When I struck, Chuckachuck said, "Take care you don't strike that axe," pointing to the axe which was sticking the body. Napaysoosee heard this.

Next day Napaysoosee drove a big file into the body, and also put a big stone into the body.

Entominahoo always had a willow stake to use in conjuring, and used it this time.

Entominahoo's wife and Napaysoosee told me that Moostoos had a lump of ice in his body which had caused his madness, and that they were afraid the ice was not melted, and he would come to life again. All the people were there, and we had been there all night watching to see if he would rise at sunrise. They would not let me go out. It was a little after midnight when he was killed. Naypaysoosee forbade me to tell all this. Entominahoo's wife poured hot tea into him. Entominahoo saw everything that was done. It was quite light, there was a big fire, as it was very cold outside.

Napaysis was going toturn Wehtigoo first. All of the people were sitting close up to Moostoos.

The medicine men always help one another. It is a rule of their order.

Kunuksoos said:—

Moostoos was my son-in-law. The shack where he was killed was Entominahoo's. Moostoos was beginning to be queer when he came into that house about three days before he was killed, but was not sick in that time. I was living in a tepee. His wife and children did not move into that shack with him. Napaysis was dying and we were all in there watching him. I was there all that time taking care of Napaysis. Throughout the last day noticed Moostoos acting queerly. His eyes and face were not right. His eyes were moving fast and he was not the same at all. The night before he was killed he said, "I am going to be wrong—I hate to destroy people." The summer before he said to me "I would hate to destroy my children, but I am thinking about it." The night he was killed, he said "If I am able, I will clear you all out to-night." At that time Napaysis was lying down and watching him. Moostoos was in another part of the house, lying down, and others around him. Don't know whether they were holding him or not. I did not look or see who were holding him or how. My back was to them, and I sometimes turned my eyes around, I saw a blow struck. Saw three blows struck with the axe. Before Payoo came in someone in the shack called, "He is going to overcome us." There was a blanket over Moostoos' head when he was struck, but I could see the outline of the head under the blanket. A minute or two elapsed between the first and the second blow, cannot say how long between the second and third. He did not move after the first blow was struck so far as I could see. He had been struggling hard and crying out before he was struck. Before the blows were struck, I saw Eliza beating him in the face with the cord. I am sure, from what I heard Moostoos say, that he was a Wehtigoo and was going to kill us all.

I understand a Wehtigoo to be a man possessed by an evil spirit, who kills everybody around him and eats them. Have heard that the people always kill a Wehtigoo.

I don't know what else we could have done to prevent Moostoos killing us. I believed we all had to die. Never heard Moostoos' wife say anything about it. She seemed to take the killing of her husband as a matter of course.

ENTOMINAHOO sworn, said:—

I knew Moostoos, and I know Payoo and Napaysoosee. It was near Spring I last saw Moostoos. I saw him in a house. People present were Napaysoosee, Payoo, Napaysis, myself and wife Eliza, another woman, don't know name, Chuckachuck, Kunuksoos, not sure of wife. Nothing wrong with Moostoos. Was in my house one whole day. He died by getting a blow. Who gave it? Chuckachuck. Napaysoosee gave him a second blow. Payoo gave him a third blow after a little time, not at once.

Chuckachuck killed him because he (Moostoos) wanted to kill the whole of us. They were holding him, Napaysoosee, Chuckachuck and a woman. Eliza was not holding him. I tried to hold him myself by the arm but he threw me to one side. If they did not hold him down they were frightened he would turn round and kill them. Moostoos had said to me "Uncle, if you don't cure me, I may kill you all and do something to my children." I tried my best to cure him. I used my medicine and had a little conjuring tent and had him in that. After we found we could not cure him, we got holding him because we feared he was going to kill us, if we did not master him. He said, "If I get up from here, I'll kill you all." He said before we held him down, "If you don't hold me down, I'll kill you all." He said that twice. It was only I that heard him say that before they got hold of him. He and I were alone, in the morning. I then tried to cure him with the medicine. It was late at night that we commenced to hold him down. Nothing wrong with him in the daytime lying asleep. *By his movements*, we took hold of him. He was going to jump up. Nothing was said about killing Moostoos.

Payoo gave the blow as soon as he came in. He was not moving very much when Payoo struck him. Payoo knew beforehand that Moostoos was going to do something. Can't say if I told him that. Some time between second and third blows. A few seconds between each of the strikes. Moostoos was moving when Napaysoosis struck him. He was moving when Chuckachuck struck him. Chuckachuck struck first. Napaysoosee second. Payoo third blow. The first blow killed him, but he was moving until after the third!

When Moostoos was being held down, we thought he was going to kill us all, because he said he was going to be a Wehtigoo. A man like that uses his spirit or his hands, anything he can lay hold of. We are all poor and had nothing strong enough to hold him. It was at night and we did not think of tryng. When a Wehtigoo gets up he cannot be mastered. We thought it was no use trying to tie him. There were seven men, but three sick; two have since died. Moostoos said, "My uncle, if I get worse knock me on the head. I do not want to hurt my children."

I was sick at that time. Napaysis was sick and very weak. Apishchikisaynis, Mihkoostikwahnis was lying in his house sick. We thought Napaysis was going Wehtigoo. Kunuksoos was taking care of Napaysis all that evening and night. I wanted to help to hold him, but he threw me away. Moostoos was very strong. I don't know about Mithkoostikwahnis being holding him. Napay-

soosee, Chuckachuck and Kunuksoos were the only three men strong enough to be of any use to hold him. Napaysis was sitting, lying near the door, I was sitting between the body and the door, the body lay parallel to the front of the hearth. I was in my conjuring tent, and when Moostoos began to try to get up I came out and went close to him. Moostoos and Napaysis were being treated. I do not know whether Payoo came in. A Wehtigoo is a man that goes crazy and kills and eats people. I saw a young girl Wehtigoo not long ago. She got better. I am old. The practice has been to kill Wehtigoos, but it is not every that can kill a Wehtigoo. It took the strongest medicine men to kill a Wehtigoo.

Entominahoo's Wife, Marie, said:—

I am Entominahoo's wife. I saw Moostoos when he was killed. I was in the shack when he was killed. I thought Moostoos was a Wehtigoo. I was frightened. Thought the evil spirit got into him. He was a good man before that. Never saw a Wehtigoo before. It is only my own husband that knows anything about Wehtigoos. A Wehtigoo kills by bodily means. Can't say if anyone could be tied up. We were sitting up all night. I did not see him move all night. Next morning some one came to another house and told us that he was getting up. We sat up because we were frightened, because we were afraid he would come alive again. I did not pour hot tea but I saw it brought in for that purpose. I heard some one say bring hot water and they brought tea. They drank the tea. I did not see the sticks on the ground, but I saw it sticking in the body. Napaysoosee might have spilt the tea. I did not help Napaysoosee to tie the legs. I saw Napaysoosee cut off the head. I did not see anyone drive a file into the body. I don't know why the head was cut off.

He was covered with blankets when the blows were struck, not the head, only a part of his body. I knew Moostoos from long ago. We were all on good terms together. We all liked him.

Kunuksoos, sworn, said:—

I am a Cree. I was present when Moostoos was killed. I heard him say (the day before) that the evil spirit was coming on him. This was said in the same house. I do not know of him saying anything else. Entominahoo was there doing nothing. I saw Entominahoo trying to cure him. That was after he said above. I did not look at what he was doing, he did not say he could cure him. I did not see anyone holding Moostoos. I could not say if he was a Wehtigoo. I don't know how a Wehtigoo feels. I do not know if Entominahoo could cure him. I did not hear anyone say he was a Wehtigoo. We had nothing to drink. We drank some ginger long before, about ten days. We drank tea. We were having a tea dance. We had a tea dance for a week.

We all liked Moostoos. He was my son-in-law. He was married to Chuckachuck's sister. The night before he was killed, I thought there was something wrong with him. In the day time by the look of his eyes. The eyes were not quiet—rolling. I never heard him before. I could see his face from where I was sitting. First, I saw his face covered and after it was not covered. I did not hear him breathing hard. I was frightened. I thought Moostoos would kill

us, and had been frightened for two or three days. I saw Eliza using the medicine belt. I saw Felix's wife there. I did not see her do anything. Felix's wife was lost and could not be found. That is why she was not brought down. I saw her last there. I know the policeman was looking for her. She came to Slave Lake and from there went away. Wehtigoo is a man-eater, who wishes to kill his friends. I heard Moostoos say he was afraid he would go that way, that was the winter before. I was there in the shack. I saw Mihkooshtikwahnis in there that day. I saw the conjuring tent with Entominahoo inside. I never saw them all play the drum and sing. I am not a medicine man. Only Entominahoo was a medicine man.

KUNUKSOO'S WIFE, ELIZA, said:—

Was in shack when Moostoos was killed. He was talking and said, "I will kill you all to-night." Did not hear anyone say anything. Did not notice Entominahoo was very much afraid. Heard him say before this happened that he would try to cure Moostoos. He did try, and could not cure him. I thought Moostoos was a Wehtigoo. I never saw any Wehtigoos, but they used to be killed. We hear about Wehtigoos all over where there are Indians. We were all frightened when Entominahoo could not cure him, we were afraid of Moostoos, the way he was acting. I did not hear them say they would do anything to him. I was surprised when I heard the blow. I thought in my mind that if he could not be cured it was as well he should die. I heard no one say "Let us kill Moostoos." They all thought it was better to kill him. I thought they were going to kill him, I don't know if they could have mastered him. I do not know other minds. He was stronger, and the stronger on account of the evil spirit. I could not say if they could have held him if he had not the evil spirit. I do not think anything else was the matter with him. I don't know what happens to the evil spirit when the man is killed. Entominahoo was our head man. I did not hear him say what ought to be done. After Chuckachuck struck Moostoos did not move. I was looking at him. After Napaysoosee struck him he did not move. After Payoo struck him he did not move. I do not know that everyone ought to kill a Wehtigoo.

MOOSTOOS' WIFE, JULIE, said:—

I was told something was going to happen. I was told my husband was going to kill us all. My husband told me before that "It is better that I should be killed than that anything should happen to my children" (that he should kill them). I did not speak to Payoo before he left the shack.

I don't remember what he told me but it was not the same day. I did not know that my husband would be killed. I heard next morning that he was killed. I don't know who told me. I felt as if I was asleep the whole time. I did not go to see the body. I never saw it. I was frightened when I heard that my husband was killed. Did not know that my husband was a Wehtigoo. He said before he was going to be one. I did not know that he would have to be killed, if he was a Wehtigoo. I heard he was a Wehtigoo at the same time I was told he was a Wehtigoo. I did not think it was wrong to kill him.

Napaysoosee, sworn, said:—

I knew Moostoos a long time. We were great friends. Moostoos was in the shack a whole day and a half the night before he was killed. I was in the house all that night. I heard Moostoos talk about the evil spirit. He said the evil spirit was in him and had the better of him. I was baptized. I was never at confession. I was always in the woods, seldom around amongst Christians. I was never taught Christian doctrine. During the last day and night Moostoos was looking different than before. He looked by his eyes as if he was going to kill us all. His eyes were flashing and rolling all day. He said, "I look on those children as young moose, I would like to eat them." He said a great deal but I could not tell what it was. When I came in, in the evening, he was lying down. There were two blankets over him. There were people sitting round. The conjuring tent was not up but they put it up shortly. I think Kunuksoos and Apishchikisaynis put it up. They knew how to make it, they had made them often. It was made four or five feet from Moostoos. I saw his face then. There was no one holding him, but Eliza and Felix's wife were sitting beside him. Then his face looked worse than before. Entominahoo went into the conjuring teepee and tried to make medicine to cure Moostoos. Kunuksoos was beating the drum a little while. Eliza and Felix's wife were making medicine. I heard Eliza singing, but there was so much noise we could not understand the words. I mean the noise in the conjuring tent and the drum. Entominahoo was a long time in the tent and came out when he heard us calling out. We called out "We are all dead," when we saw that Moostoos was going to get up and master us. I was holding him. Chuckachuck, Eliza and Felix's wife, I think Entominahoo was holding him after he came out of the tent. I was holding his wrist and gave it to Entominahoo, but he could not hold and was thrown to one side. Moostoos was making a noise and tried three times to get up, and stood up and jumped in the air. Everyone called out "We are dead." At that time he said, "I will kill the whole of you this night." I heard him with my ears. We pulled him down, four of us, and got him on his back. I covered his face with a blanket. Then four of us, along with Entominahoo, held him. I held right arm. Chuckachuck left. Eliza left and Felix's wife right leg, all under the blanket. He was struggling hard. He tried to bite me twice but only caught the coat. He was very strong. We could not have held him much longer. He was throwing up his head and grinding his teeth. Eliza had a plaited worsted belt, a medicine belt. She had two other things in her hands, an axe and a pair of scissors. Eliza thrashed him with the medicine belt, standing at his left. Felix's wife had something in her hand, a bag and a piece of iron. She came round, and I am not sure what she did with it, but I thought she put it towards the breast. Eliza had the axe in her left hand when she was doing the whipping. Our faces were towards the ground as Eliza was whipping. I heard the sound of the beads on the blanket. I heard Eliza say something to Chuckachuck, it was, "Here my brother-in-law." Eliza handed Chuckachuck the axe. Eliza said no more. Chuckachuck gave Moostoos a blow on the left side of the forehead. The blanket was over his face. There was blood from the belt, and blood came from the cut. He

never moved after that blow. I would have felt if he had moved. It was some time after that that I struck. Chuckachuck said, "You are a coward if you do not strike him, we will all be killed." Chuckachuck gave me a knife, someone gave me an axe. I think Entominahoo's wife gave me the axe. I gave a blow on the left side and left the axe in the wound. I drove the knife into the bowels first and left it also in the wound. Payoo was in the other shack. He did not come in very soon. I could go about forty feet before Payoo came in. I heard a call before Payoo came in. It was, "We are all dead, come here and see." (I was one that called, Chuckachuck another). You have children, we will be killed, you are kind-hearted." As Payoo was giving the blow he said to the axe, "Don't jump back." He got the axe from somebody. I do not know who in the house. He did not bring it in. Payoo struck on the forehead. That was the last blow that was struck. We stayed there till daylight. It was my house. Apishchikisaynis and Kunuksoos and Napaysis went out. The rest stayed in. I don't know why they stayed there. We were sitting round the body. I thought he was dead. Chuckachuck told me we had better stay as he was afraid Moostoos would come to life again. I thought, and said in the morning he was coming to life. I thought I heard a noise in his body. Almost daylight something was done to the body. Payoo and I did something, and a woman, Entominahoo's wife, and I tied the legs. I don't know who told us. We tied the legs because we were afraid he would get up. Payoo and I struck that stick through the breast into the ground. We were afraid of him getting up, though he was dead already a long time. I think it was Entominahoo's wife told us. We stuck the stick in so that he could not get up. We believed he had an evil spirit in his body. We thought he had ice in his breast, therefore we poured tea into the body. We were going to melt the ice so we got the hot tea. We poured the tea in the same hole where the stick was driven in. I don't know who made the tea. It was brought in from outside. The man was dead while this was done. I was afraid he would rise again. I do not believe another man could rise, but that man could. There was no person in that house in his right senses. I cut off the head. I was told to do it. That was the last thing that was done. Payoo was there, also, I think, Entominahoo and his wife, and Mihkooshtikwahnis, went out because he was frightened.

Cross-examined. Chuckachuck struck first. I was not aware of any movement from Moostoos. He was still breathing. Before I gave the blow he had stopped breathing. After I gave him the blow he was still breathing. When I gave the blow I struck through the blanket. I struck because my brother-in-law told me to. Entominahoo tried all his best to cure him, and because he could not cure him this happened. Entominahoo said he could do no more. All in the house were willing to kill him. They all heard what Moostoos said and they were all willing to kill him. Chuckachuck and I called out to the crowd, "We are going to die." We heard, "Try your best we will be all dead anyway." After that Eliza started to strike him with the belt. I thought then that he would have to be killed but did not say it. They were calling out when Payoo came in. If Moostoos had not had an evil spirit in him we could have held him down. I have heard of Wehtigoos twice before. Once

saw the track of a Wehtigoo. When Indians know an Indian is a Wehtigoo they try to kill him.

Payoo, sworn, said:—

I was in the band when Moostoos was killed. I did not go in where Moostoos was till I gave a blow. I could hear from outside what was going on inside. I could hear that there was a conjuring tent in the house and that they were making a noise. I heard the drum sometimes. I heard one singing, could not say who. It was not a woman. I went into that shack that night. I heard Napaysoosee calling, "Come and see him." I knew what was going on, they were making medicine for Moostoos. I was sitting with my brother-in-law and the women. I went into Entominahoo's shack. The two shacks were about thirty-five feet apart. When I went in I saw the man was dead. The body was all covered with blankets. He was lying alone, they had left him alone. I saw two axes and one knife. The knife stuck in the bowels, one axe stuck in the chest and the handle downwards. Chuckachuck and Napaysoosee were close to the body. Chuckachuck kneeling and Napaysoosee standing. Napaysoosee said to me, "He is going to rise from the dead when the sun gets so high, you will see." I was told by Chuckachuck and Napaysoosee to strike. I took an axe and struck. I thought on the body, but it seems it was on the head. I felt afraid. I was thinking about my children. I was there till daylight. I heard about tying the feet. What I heard of Napaysoosee's story was correct. The first time I struck the stake it would not go in, and Napaysoosee made marks on it and made medicine and it went in right. I would not go near the house because I was afraid of Moostoos and the medicine work. I was not in the house before.

When I went in Moostoos was covered all but his feet. Napaysoosee was the only man who told me. When we were sitting in the other shack we heard the noise and the women singing. I heard from the house what they were saying. I heard them saying that they were going to try and kill him with their medicines. I knew what they were going to do. Mihkooshtikwahnis told me Moostoos was going to be Wehtigoo. He said it would go hard with them if they could not do anything with Moostoos. It would be hard on them if they could not kill Moostoos. I did not go at once till I heard the noise calming down. I went because I was called over, as they were all frightened. They did not name me. I never looked under the blanket. I did not strike at once, nor till I was told to give the blow. I saw the man was dead. His arms were straight. There were two holding the blankets, the two women were sitting on one side.

First, he said, they were going to cure him, then they were going to try and drive the evil spirit out of him.

Although the result of the trial is of no importance as far as the "study" is concerned, it may interest those who have read the foregoing condensed evidence to know that the jury after four hour's deliberation brought in a verdict of "not guilty" so far as Payoo was concerned, and "guilty" of manslaughter against Napaysoosee.

The Hon. Justice Rouleau quite agreed with the jury that notwithstanding the peculiar circumstances some punishment was necessary. Napaysoosee was therefore sentenced to imprisonment for two months.

THE CARIBS OF GUIANA AND THE WEST INDIES.

REV. DR. W. R. HARRIS.

On the north end of the island of St. Vincent, West Indies, there is a level tract of country between the volcanic mountain La Soufriere and the sea, known as the Carib country. This district or reserve was allotted to the Indians after the rebellion of 1773 on condition of surrendering their arms and acknowledging the King of Great Britain as sovereign of the island. Early in April, 1902, La Soufriere (4,048 ft.) awoke from its long sleep of ninety-two years and began to emit smoke. At 3 p.m., May 5th, a dense cloud of steam rose from the crater followed by tremendous detonations and a rain of ashes. The telegraph cables between Martinique and St. Vincent broke the same afternoon. The morning of May 5th the negro police, commanded by Captain Calder, escorted the Caribs, their wives, children and effects to Georgetown, and settled them on a deserted plantation outside of the zone of danger. Between twelve and one o'clock of May 7th, the roaring of the volcano was heard far out to sea, the lightnings were terrific. At the same hour the crater lake burst its cerements and the Rivers Wallibou and Rabaca rushed towards the sea in raging floods of boiling water. This rush of boiling water cut off the escape of the fugitives from the windward side of the island, including the Carib settlement, and caused the loss of two thousand three hundred lives. By the timely intervention of the government the Caribs were saved. On the afternoon of the 30th of October, 1902, accompanied by Captain Calder, I visited these Indians on their new reservation. The tribe numbered two hundred all told, and were not unlike a group of Mississaugas I had seen at Wikwimikong, on Manitoulin Island. They were skilful fishermen, clever basket-makers and adepts in many curious arts. They retained their old language and their old manners, and except that they no longer went to war nor ate their prisoners, lived according to their old habits. By the census of 18'1, we learn that there are on the Island of Dominica three hundred and nine Caribs, and on Trinidad about one hundred and forty of the aboriginal tribe. Taking no account of those known as the black Carib—offspring of escaped slaves and Indians, the present population of the Caribs, of the West Indies, is from six to seven hundred, confined to the islands of St. Vincent, Dominica and Trinidad. When in Georgetown, British Guiana, I passed some days with Mr. Evans, the city librarian, who most courteously permitted me to consult all the books and manuscripts in the library, treating of the Caribs, from the discovery of Guiana to the present day. Historians and writers for the past four hundred years differ so much in their opinions of these agorigines that it is impossible to frame a true es-

timate of their character. Fernando Colombus, son of the great navigator, says in his diary: "These savages are almost negroes in color, they are bestial in their habits and go naked. In all respects they are very rude, eating human flesh and devouring their fish raw as they catch them. They are false, cruel, treacherous and revengeful; lacking humanity, victims of instinct and impulse. They have the kind of social instinct found in animals, but are unable to ascend to a conception of a universal law which binds all nations in a common brotherhood." Again, Davies, the historian of Dominica, writes in 1666: "The island is inhabited by hordes of hostile savages, who dwell among horrid and unnatural scenery, infested by an infinite number of reptiles of dreadful bulk, monstrous serpents. Refugee slaves flee to them, (the savages) intermarry and beget black Caribs." Sir Walter Raleigh contends for the bravery and chivalry of the Caribs of the Orinoco, and Bryan Edwards in his History of the West Indies says, "the Caribs were found all over Guiana from the Orinoco to Brazil and in some of the West Indies. They were men of undoubted courage, and superior in intelligence to those of the interior." That races of Anthropophagi were known to exist before the time of Columbus is attested by many historians and travellers but they were not called *Cannibals* till after the discovery of the West Indies and the Orinoco river. Shakespeare was among the first of English writers to associate the word cannibal with man-eaters when in act iv. Coriolanus, he makes one of his characters say: "And he had been canibally given he might have broiled and eaten him too." The name is of Spanish origin. Many of the early writers used *caribal* and *canabal* indifferently. It is, probably, from the latin *canis*, a dog.*

Even in 1837, when William Hillhouse visited the tribes on the banks of the Cuyuni, he described the Caribs as "lazy, drunken and faithless; at the best, proud, filthy and unsteady. All Indians are gluttonous, but the Caribs will outeat all other tribes." Writers such as Mack (1803), Schomburgk (1826), Clements and Van der Loth picture them as brave and fearless, cunning in strategy, and excelling in endurance. From my studies of the sources of information within my reach, I am of the opinion that he was as closely allied to our Iroquois in habits, customs, skill in attack, fierceness and endurance as it was possible for one savage tribe to resemble another, taking into account the variations of climate, forest life, and the conditions of existence. In the beginning of the eighteenth century, Pére Labat, a French missionary, paid a visit to the West Indies. He was an observant traveller, and had passed some time with the Seminoles of Florida, and with the tribes along the Ohio and the banks of the Mississippi. Froude in his "English in the West Indies," pauses to speak eloquently of his scholarship and accuracy. When Labat visited Dominica, a tribe of original Caribs inhabited the island forests, living their old life, and except that they were then professing Christians and no longer ate their captives, following their old habits. The pére was an expert linguist, and, before philology had become a science, was a student of lan-

*Some derive it from *caro, carnis*, flesh.

guages. From the speech of the Caribs, he concluded that they were of the same race as the North American Indians. Their dialect bore a striking affinity to that of some of the nations he had visited in his travels. They called themselves "Banari," that is, come from over the sea. Unfortunately there are no records, monuments or ancient remains to testify to their past history. They may have hunted in these desolate forests before the Redemption, or they may have antedated the Noahic flood. Their customs and habits prove them to be indigenous, but certain oriental remains of prehistoric days show that they are not autocthones. Hatchets of polished diorite or serpentine, arrow heads of argellite, chalcedony and obsidian found near Bayane, Demerara; relics discovered in caves near Cape Maise, and deposits of human remains called "caneys," indicate great age. Ask the young Indian of Guiana about his dead father, and he will tell you his father was famous for slaying cougars, serpents and caymans, and noted in the chase of the tapir, the wild boar and jaguar, but of his grandfather he remembers nothing. On the Cuyuni river and tributaries of the Berbice are mountain rocks whose river faces are carved with cabalistic characters and picture writings called "Timberi" by the learned societies of Demerara. No man has yet deciphered them, and, like the hieroglyphics on the Palenque tablets of Yucatan, they are the despair of the learned. By whom these rocks were cut, with what instruments, at what time, and for what purpose, no one knows, but they are all that exist to tell unto civilized man that other men of a strange race sailed these far inland rivers before him.

And now, let us attempt to trace the affinity of habits, customs, manners and polity existing between these Indians of the Guianas—British and Dutch—and the tribes of our own country. At the present time, there are five nations or tribes in Guiana commonly known by the names of Warow, Arowak, Acowais, Macoushi and Carib. The five are practically one great family,—sprung from a common stock, but differing in dialect and local customs as the Hurons and Iroquois were distinct from the Attiwandarons, though of the same root. Each of these tribes has its own great Council House or "Tabouy" where feasts are celebrated, affairs of state discussed, meetings held, and deputations received. They live in small villages consisting of twelve or fourteen carbets or palm cabins. These bourgs are always constructed near a river or small lake where the fishing is good and the land fertile. Each family clears for itself a plot of ground, and plants it with pepper, papaw, cassava, plantains, sweet potatoes and pine apples. They keep no cows, horses, goats, fowl or sheep. They are expert hunters and skilful in the use of the arrow, blow pipe and spear. Their canoes—woodckins they are called in Guiana,—are made like our own, and in the handling of the pagaye or paddle they have no superiors. Many of them have been converted to Christianity, but numerically they are still pagan. Association with the whites has debauched those near the plantations and towns, and sinking under impoverished resources, they are gradually decreasing. In Georgetown, the capital of Demerara, there is a large covered market-place or bazaar where the Indians meet from time to time. They bring with them parrots,

bows, arrows, monkeys, and birds of beautiful plumage, which they sell to sailors and visitors. The proceeds of their sales are too often squandered in rum for which they have an unconquerable relish. Such is the condition of the Indians of Guiana to-day.

Let us now rapidly trace their life as it was in the old days. There is no record to prove that the Indians of lower Venezuela ever professed any religion, or practised any religious ceremony. "I believe if the truth were known," writes Charles Waterton, the ornithologist, who spent years in the forests of Guiana in the beginning of the nineteenth century, "the Indian never offers up a single prayer or ejaculation to God." In another chapter of his "Wanderings in Guiana," he states they beseech Yambrabin, the god of evil, not to harm them, never addressing a petition to Wacinaci, the great spirit whom they believed to be too good and loving to do them harm. Every tribe, however small, was ministered to in disease and sickness by a Pay-i-man (Shaman). He was conjurer, soothsayer, physician, priest and clairvoyant. When anything was lost he was consulted, and when anyone was sick he rattled the calabash around them and besought the evil spirits to go away to their enemies. If a fever attacked the village, the Pay-i-man went through the village street, and around the cabins, howling, beating the sides of the shacks, and imploring, with dreadful imprecations, the evil spirits to depart. If the fever continued, proving his incantations too feeble for the visiting devils, they abandoned the site forever, and began a new settlement in another part of the forest. They never killed or injured the owl or goat-sucker—birds of omen or reverential dread. They were regarded as the living tabernacles of departed souls who, unable to rest in the spirit-world, returned with the permission of Yababion, the Demarara Indian devil, to haunt their enemies and avenge the wrongs done upon them in their days of nature. If a goat-sucker, a night-bird, perched on an Indian's cabin and began its weird and plaintive dirge, misfortune or death was sure to follow, and they awaited the event in terrible suspense. A day's march beyond the great falls and rapids of the Essequibo river, two immense rocks tower aloft upon the summit of a neighboring hill. Their situation and their extraordinary shape strike the traveller with awe, and bear in upon him an impression of ancient grandeur he can never forget. From time immemorial these rocks were supposed to be the abode of an evil spirit who demanded and received from the passing Indian a tribute of tobacco smoke as a peace-offering.

The tribes were subject to few diseases apart from small-pox, diseases of the lungs, and peculiar throat troubles. The yaws was a common disease with which they were and are afflicted. The yaws manifests itself in large ulcers. When the ulcers assumed a yellow appearance, the patient was carried to the river and after his sores were washed he was rubbed with boiled lime juice mixed with charcoal.

Funeral ceremonies were not always the same among the nations. Among the Arowaks, after the dead body was washed and the head annointed with oil, the corpse was placed in a hammock and buried in a sitting position. The arms, pipe, and trappings of the dead

man were buried with him so that he might enter the hunting-grounds of the spirit-world, and with bow, arrows and blow-pipe fittingly set out upon his new life.

The Caribs, like the Neutrals, retained the dead in their cabins for a month, and when the odour of decomposition became insupportable, they buried the corpse with the oldest of the living wives. After a year the bones were taken from the grave, cleansed and placed in a basket, which was hung from the rafters of their dwellings.

The war-chief was elected by the tribal warriors after undergoing a frightful ordeal. He had no voice in the great council which was presided over by a national chief, who settled the internal and foreign action or policy of the tribe. Before the honor of election to the office of first warrior of the nation was conferred upon a brave he must, already, have given proofs of his fitness for the office. Of his endurance, bravery, and cunning, there could be no doubt. He was familiar with the haunts of wild animals, their migrations and habits. He was acquainted with the enemy's country, the springs of water and the forest trails. When notified of his selection for leadership he entered upon a preparatory fast of three days. After the completion of his fast he strode into the Council House accompanied by two companions who repeatedly spoke words of encouragement to him and exhorted him to be brave. Accompanied by the councillors he walked to an adjoining field, and in the presence of the assembled spectators removed his tournoue, or loin cloth, placed his hands clasped upon his head and calmly awaited the torture. Two warriors now strode into the ring, armed with maquaries or twisted whips of the pita wood. The flagellation that followed was frightful. The blood trickled down his naked body and ribbons of skin fell away from his bronzed back. He was then placed on a barbecot or wooden grate, under which a fire was started. If he fainted, he was lifted off and sprinkled with water. If he endured this torture unmoved and showed no fear, he was hailed as war chief of the nation amid the plaudits of the men and the caresses of the women. Before entering the war-trail the warriors tattooed their bodies with racou dye and perfumed them with the extract of the hayawa, or acouri plant.

The campaign was conducted on lines similar to those of the American Indian. All prisoners taken in war were either killed or held in slavery. Torturing by fire may have been practised, but there is no record to prove it. It is probable that cannibalism obtained among all the tribes of Guiana, but the early Spanish adventurers having dealings only with the Caribs of the West Indies, Trinidad and the Orinoco, confined the practice to this nation. Human flesh was not their ordinary food. They boucanned* or smoke-dried the limbs of famous warriors whom they had slain in battle or took prisoners, and at special festivals handed them around to be gnawed, hoping, like the Iroquois to inherit some of their enemies' courage.

*From Caripbean *boucan*, a place for smoking meat, hence our word buccaneer, ona who concorted with the natives, and played pirate.

When a Guiana Indian wished to marry, everything was arranged for him by the parents, relatives, and intimate friends of the girl. The young man presented himself on an appointed day before the hut of his prospective father-in-law, when, after listening to an exhortation from one of the nearest relatives of the girl, and receiving the consent of her parents, the ceremony closed with singing, dancing, and drinking of a fermented liquor called *piwarri*, the bridegroom brought his wife to his own shack. Polygamy was a common practice, and the wives were garden and household drudges. When a woman gave birth to twins she killed and secretly buried or drowned one of the infants to avoid suspicion of adultery. Strangely enough the tribes in the valley of the Orinoco circumcised their children on the eighth day. These were the Salivas, the Guamios and the Othomas. When and where did they acquire this Phœnician and Hebraic custom? ("Beschryving van Guiana," by I. I. Hartsuik, 1770).

Descent and succession among the Demerara tribes were in the female line, the same as among the Huron-Iroquois and many other primitive peoples in various parts of the world.

Morals, in the technical sense, they had none, but having no knowledge of the law they could not commit a breach of the law. They were "naked and not ashamed."

Among some of the tribes of lower Cayenne the "Couvade" obtained. When a warrior's wife was confined for the first time he betook himself to his hammock, which hung from the roof. His only food for three weeks was a small allowance of cassava and water. When his fast and lying-in were completed he left his hammock. His breast and back were then scarred with the teeth of the acouri and after a receiving a few lashes from a pita whip he left his home for a few months and became a servant to some distant neighbor. Such was "La Couvade" which led the early Spanish legendists to report that in Cayenne the men, and not the women were confined.*

When Columbus visited the West Indies, the Caribs held possession of the islands of St. Vincent, Dominica, Trinidad and Martinique. Of the four tribes which soon after began to trade with the Spaniads and the Dutch, the Carib population was roughly estimated at 140,000, about a fourth of whom were settled between the rivers Corentyne—now the boundary between British and Dutch Guiana, and the Essequibo, dividing Venezuela and British Guiana. The tribal lands of the great body of the Caribs stretched through the delta of the Orinoco and the district to the north-west of the river known to this day as Caribiana. The estimate of Major John Scott,

*The Korovans of Madras, Tylor, Vol. I, p 76, "Primitive Culture," the Eskimo of Greenland, Egedis' "Greenland," p. 196; and the Coroados of Brazil, "Spix and Martin's Travels," Vol. 11, p. 147, have similar customs. Giliz, de tertire, Fermin, Biet and Brett refer to the custom in Guinna and other South American countries.

It is practised in Yuman, China; by the Dyaks of Borneo; and in Europe we find it in Corsica, in the south of France and in the north of Spain.

Crawley also mentions the practice as existing among the Digger Indians of California; and "In Zarzandan, and amongst the Ainus, Miris, and Miaos, the Lagunero and Ahomama, the Carids, and in Martinique, Surman, Brazil, amongst the Jivaros, Mundurucus, Macusis, Arowaks and Arecunas, and in Wanga, Malabar and the Nicobars." "A study of Primitive Marriage," by E. Crawley, p. 419.

made in 1666, makes the population of British Guiana, as far as the Orinoco, to be 28,000 families of Caribs and 8,000 "fires" of Arowaks. Scott's census takes no account of the Acowais and Warows. All these nations traded with the British, Spanish and Dutch, exchanging tobacco, cotton and spices for trinkets and rum. Even as late as 1795, Captain Alexander, in his "Transatlantic Sketches," says that in the rebellion of that year eight hundred Carib warriors took the field. The Carib population of the West Indies and Guiana, at the present time, numbers from six to eight thousand; and the people live as their forefathers did by hunting and fishing. Anyone at all familiar with the history of the Huron-Iroquois nations will at once detect a striking similarity between them and the Indians of Guiana in many of their customs, habits and ceremonies. Particularly is this pronounced in their village life, their great Council House, their war chiefs and judicial chiefs, in the build of their canoes, in their belief in good and evil spirits, descent in the female line, and the identity of ceremonies practised by both in exorcising evil spirits from the bodies of the deceased and the fever-stricken villages. Again, take their fear of the demon-haunted rocks and the propitiation of the evil genii with tobacco smoke; or look into their treatment of the dead, their belief in the spirit world, the sitting burial and the buried arrows, blow-pipes, bows and outfit for the land of ghosts. Once again study the motive of the Carib and Iroquois in eating the flesh of a brave enemy, their rock inscriptions, and the preparatory fast of the war chief. Unfortunately, I could not obtain any grammar or dictionary of the Carib language, and therefore am unable to verify by comparison Père Labat's statement that the dialect of the Caribs was identical with that of some of the tribes he had visited in North America.*

Their method of counting, too, is to us, somewhat peculiar. They have simple words for one, two, three and four, but for five the Arowaks say abar-dahk-abu "one hand and so on, up to nine, but ten is biam-dahk-abu, meaning two hands." Above ten and up to twenty the name of the numerals refer to their toes (kooti). Thus eleven is expressed by abar-kooti-bana, and twelve biam-kooti-bana. When twenty is reached they say "one man," abar-loku.

Similarly the Carib word for ten means "both hand fingers" and for twenty, "both hand fingers and both feet toes."

Many primitive peoples count in this way, or in some such way, and our own word five is claimed by Humboldt to be connected with the Persian word *pendji*, a hand.

*The island Caribs have two distinct vocabularies, one used by men and by women when speaking to men, the other used by women when speaking to each other, and by men when repeating *oratio obliqua* some saying of the women. Their councils of war are held in a secret dialect or jargon, in which the women are never initiated. It has been suggested that this inconvenient custom, according to which a Carib needs to know, like Ennius, three languages, is due to exogamy, husband and wife retaining the languages of their original tribes respectively. This explanation, however, does not account for the martial dialect, and has been refuted by Mr. im Thurn on other grounds *The Mystic Rose*, by E. Crawley, pp. 46-7.

Robert Thomas Anderson.

Robert T. Anderson, who lost his life by drowning at Go Home, Georgian Bay, on June 16th, 1903, was one of the most brilliant members of the class of '04, and his whole undergraduate career gave promise of a successful future. He was born at Elora, in 1878, but received his school training at Barrie and Aylmer. The foundation of his education was laid at home, and not until he was twelve years old did he enter the Public School at Barrie. In two years he was ready for the high school, and passed the entrance examination at the head of his class. In 1894 the family removed to Aylmer. Here he matriculated in 1899, and entered Victoria with the class of '03. Next year he was compelled to leave college, but he returned with the class of '04, of which he was a member at the time of his death.

From his earliest years he showed a great love for nature, and this deepened into the great passion of his life. "Bob's" botanical and mineralogical collections, as well as those of insects, and birds, and their nests and eggs, were very large, and ranked among the best in the country. He was also a skilled taxidermist. *Acta Victoriana*, Oct., 1903.

It was in the Archæological field that Mr. Anderson was best known to us. His work along this line, he conducted quite as intelligently and as enthusiastically as if it had been his special subject of study, and what he did, he did thoroughly.

Much that many would be disposed to regard as trivialities, he refused to look at in this light, and the results he sometimes reached, showed the value of his patient investigations.

Since boyhood he evinced much interest in the archæological work of the Provincial Museum, and last year he presented to it a large number of excellent specimens.

Mr. Anderson was as modest as he was bright. He was perfectly free from any exhibition of that conceit which is so often offensive in young men of a scientific turn, yet he had the courage of his convictions, and maintained with firmness any position he thought was right.

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UNIVERSITY OF TORONTO.

AUDITOR'S REPORT

TO THE

BOARD OF TRUSTEES

ON

CAPITAL AND INCOME ACCOUNTS

FOR THE

YEAR ENDING 30TH JUNE, 1903.

ADOPTED DECEMBER 4TH, 1903.

TORONTO:
Printed and Published by L. K. CAMERON,
Printer to the King's Most Excellent Majesty
1903.

TORONTO:

WARWICK BROS. & RUTTER, LIMITED PRINTERS.

UNIVERSITY OF TORONTO.

AUDITOR'S REPORT

TO THE BOARD OF TRUSTEES OF CAPITAL AND INCOME ACCOUNTS FOR THE

YEAR ENDING 30th JUNE, 1903.

Toronto, 30th September, 1903.

To the Trustees of the University of Toronto :

Gentlemen :—I have the honour to present the financial statement for the year ending 30th June, 1903.

The estimates for this financial year passed by you on the 11th of October, 1902, show :—

Expenditures	$168,926 83
Less those upon four departments maintained by the Government	36,334 00
	$132,592 83
Available revenue	114,482 35
An estimated deficit of	$18,110 48

The income exceeded this estimate to the extent of $2,492.63, the excess arising mainly in the item of fees. The expenditures were less than the estimate to the extent of $948.38. Those upon the aforenamed four departments were $36,144.90. On account thereof $32,000 has been advanced by the Province, leaving $4,144.90 yet to be paid.

The deficit of 1902 was duly paid by the Provincial Government. This year's deficit is shown in Schedule 5c of this report to be $14,669.47, which, following last year's procedure, is returned as due from the Provincial Treasury. These amounts, $4,144.90 and $14,669.47, make the $18,814.37 appearing in Schedule 9, as yet to be received on last year's revenue account.

Whilst following the form adopted in previous years, this report gives more detail of the year's outlays. There is also added, in Appendix 6, following your instructions, an apportionment of revenue, receipts and expenditures as between the University and University College.

The valuations attached to lands and buildings are still upon the 1892 basis.

W. H. CROSS, Auditor.

APPENDIX 1.

Balance Sheet 30th June, 1903.

Funds.

General Endowment Fund	Schedule	1	$3,505,902 68
Specific Endowment Fund	"	2	80,646 26
Retirement Fund	"	3	73,492 48
Trust Funds	"	4	24,960 03
Revenue Reservations	"	5	15,397 73
			$3,700,399 18

Assets.

Site Lands, Buildings and contents, Schedule	6		$1,621,448 82
Unproductive Lands	"	7	777,945 13
Leased Property	"	8	522,856 83
Investments	"	9	778,064 28
Past due fees	"	10	84 12
			$3,700,399 18

SCHEDULE 1.

General Endowment Fund.

Value of additions to Library during year 1902-1903, as shown by accession catalogue	$6,114 02	
Less depreciation of three per cent. upon $131,349.85	3,940 49	
		$2,173 53
Fund of 30 June, 1902		3,503,729 15
Fund of 30 June, 1903		$3,505,902 68

SCHEDULE 2.

Scholarship Trust Funds.

Blake, Matriculation	$23,303 29	
Blake, Science and Moderns	3,750 00	
Moss, Classics	2,000 00	
William Mulock, Classics and Mathematics	2,000 00	
Daniel Wilson, Natural Science	2,000 00	
George Brown, Modern Languages	1,128 34	
George Brown, Medical Science	5,391 72	
Mary Mulock, Classics	2,778 74	
William Ramsay, Political Economy	1,009 42	
Julius Rossin, German	1,000 00	
Bankers, Political Science	1,200 00	
John Macdonald, Philosophy	2,030 00	
Physics	2,350 00	
Prince of Wales Prize, General Proficiency	950 00	
Mackenzie Memorial	17,834 60	
Fulton Bequest	3,291 30	
Starr Bequest	4,860 68	
Lyle Medal	196 55	
Young Memorial	3,246 62	
Gibson, Matriculation	100 00	
Board of Trade, Commercial	200 00	
Kirschman Scholarship	25 00	
		$80,646 26

Note.—Transactions for Year.

Return of 30 June, 1902	$80,143 97	
Interest appropriation	3,791 84	
Rent, Starr farm	120 00	
Dale Scholarship	60 00	
McCaul Scholarship	75 00	
Reeve Scholarship	250 00	
Kirschman Scholarship	25 00	
Goldwin Smith Scholarship	50 00	
Sinclair Scholarship	25 00	
Clark, Medical Psychology	50 00	
Flavelle Travelling Fellowship	750 00	
	$85,340 81	
Scholarship Expenditures	4,694 55	
		$80,646 26

SCHEDULE 3.

Retirement Fund.

Beneficiaries 30 June, 1903.

James Loudon	$7,718 52
Alfred Baker	4,764 96
Maurice Hutton	4,764 96
R. Ramsay Wright	4,764 96
W. J. Alexander	4,764 96
J. G. Hume	4,487 32
J. F. McCurdy	3,803 14
James Mavor	3,541 25
G. M. Wrong	2,885 48
A. B McCallum	2,409 09
W. H. Fraser	2,409 09
John Squair	2,409 09
J. E. Berkeley Smith	2,343 00
John Fletcher	2,193 80
W. J. Loudon	1,798 34
D. R. Keys	1,798 34
H. H. Langton	1,646 14
W. Lash Miller	1,316 09
W. S. Milner	1,282 54
J. H. Cameron	1,282 54
G. H. Needler	1,282 54
August Kirschmann	1,259 88
A. T. DeLury	1,125 69
C. A. Chant	1,125 69
Adam Carruthers	1,102 70

James Brebner	1,091 77	
J. C. McLennan	807 51	
W. R. Lang	801 79	
R G. Murison	572 33	
G. W. Johnston	572 33	
P. Toews	367 58	
T. L. Walker	338 71	
F B. Kenrick	166 73	
F. B. Allan	166 73	
F Tracy	164 79	
B A. Bensley	73 58	
W H. Piersol	50 75	
J. H. Faull	37 87	
		$73,492 48
Fund of 30 June, 1902	$64,395 61	
Interest as per terms of O. C.	3,966 77	
Contributions, 1902-03	6,126 04	
	$74,488 42	
Withdrawal, E. C. Jeffrey	995 94	
		$73,492 48

SCHEDULE 4.

Trust Accounts.

Library Funds:		
Insurance, balance 1890 fire indemnity	$11,207 24	
Greek	30 00	
King Alfred Millenary fund	10,180 70	
Phillips Stewart bequest	1,447 42	
		$22,865 36
Museum donations		44 78
Biological students' supply		7 69
Local lectures fund		228 91
Residence extension fund		989 22
Langton Memorial		30 00
Sir Wm. Mulock		664 12
Alumnae prize, English		10 00
Pastoral Plays		119 95
		$24,960 03

Note as to Year's Transactions.

Return of 30 June, 1902	$27,789 43
Interest appropriations	932 58
Receipts during 1902-03	1,775 17
	$30,497 18

Library expenditures from :—		
Insurance account	$3,279 06	
Medical fund	600 00	
King Alfred Millenary fund	219 30	
Biological students' supply account	787 22	
Local lectures fund	237 61	
Convocation Hall fund	405 75	
Mineralogical account	8 21	
	$5,537 15	
		$24,960 03

SCHEDULE 5a.

Contingent fund	$18,065 92	
University Press, reserve for Calendar	725 00	
		$18,790 92
Outlays in Suspense.		
Dining Hall advances	$2,093 19	
Printing Plant, portion of cost of equipment	1,300 00	
		$3,393 19
Outstanding Revenue transactions		$15,397 73

SCHEDULE 5b.

Income Accrued but not Due.

Accounts.	30th June, 1902.	30th June, 1903.
Debentures	$6,110 37	$5,796 05
Mortgages	4,998 60	4,095 83
Park Rentals	5,576 25	6,258 20
School of Science Rentals	154 58	154 58
Business Rentals	808 84	808 84
City of Toronto	1,500 00	1,500 00
Interest from land sales	858 40	1,289 80
Endowment item totals	$20,007 04	$19,903 30
Agricultural fees	46 22	24 62
Fees past due	21 00	59 50
	$20,074 26	$19,987 42

SCHEDULE 5c.

Revenue, 1902-03.

Income.

	Estimate.	Actual.
Interest—		
On Purchase moneys	$4,918 31	$5,882 99
On Loans	15,319 49	14,663 45
On Debentures	11,503,14	11,192 28
On Bank balances	1,800 00	1,919 15
Rents—		
University Park	13,982 50	14,462 90
Business properties	3,430 00	3,447 29
School of Science	925 00	925 00
Medical Faculty	1,900 00	1,900 69
Board of Health	200 00	200 00
City of Toronto Payment	6,000 00	6,000 00
Legislative grant, general	7,000 00	7,000 00
Wild Lands sold	3,000 00	2,014 76
Sundry earnings land	1,400 00	1,691 27
University and College fees	52,000 00	54,367 08
	$123,378 44	$125,666 17
Less interest on trust funds reserved	8,896 09	8,691 19
Income	$114,482 35	$116,974 98

Outlays.

Appropriations as per estimates passed by the Trustees 11th October, 1902	$132,592 83	
Less unused thereof as per Schedule 5d	948 38	
		131,644 45
Specific Grant for 1902-3		$14,669 47

Note.

Anticipated deficit as per estimate of October, 1902		$18,110 48
Income received in excess of estimates	$2,492 63	
Saving in expenditure as per Schedule 5d	948 38	
		3,441 01
Actual deficit, year 1902-3		$14,669 47

SCHEDULE 5d.

Revenue Expenditures, 1902-3.

Service	Appropriations.	Unforeseen.	Unused.
Salaries	$90,782 00		$723 32
Pensions	1,883 33		
Bursar's office	750 00		7 38

Service—	Appropriations.	Unforeseen.	Unused.
Registrar's office	3,000 00	.....	243 56
Vice-Chancellor's office	750 00	.....	80 00
President's office	450 00	.....	3 27
Law Costs	2,000 00	.....	26 57
General incidentals	1,500 00	.....	
Insurance	1,800 00	$588 60	
Telephones	325 00	.....	27 50
Convocation expenses	500 00	400 00	75
Examinations	6,625 00	19 64	
Library building	800 00	.....	89 97
Library	2,600 00	.....	
Grounds	3,000 00	.....	6 76
Main building	4,950 00	200 00	8 84
Biological building	2,200 00	.....	244 25
Biological Department	2,134 00	.....	96
Physiological department	812 00	.....	
Psychological department	300 00	.....	04
Mathematical department	76 50	.....	24 01
Political Science department	100 00	.....	39 99
History department	50 00	100 00	72
Italian and Spanish Department	20 00	.....	
University advertising	400 00	150 00	24 35
University incidentals	200 00	.....	8 98
Classical department	155 00	.....	21 10
English department	100 00	.....	
French department	30 00	.....	3 35
German department	30 00	.....	23 35
Oriental department	25 00	.....	
University College stationery	75 00	.....	30 68
University College printing	75 00	.....	34 31
University College advertising	100 00	.....	53 78
University College incidentals	150 00	.....	15 10
Gymnasium and Students' Union	1,080 00	.....	163 25
Educational Council reception		250 00	08
Conversazione		150 00	
Renovation, Y.M.C.A. building		159 00	
Vaccination expenses	565 00	19 55	
University Press	1,200 00	.....	78 95
	$131,592 83	$2,036 79	$1,985 17
Unforeseen	1,000 00	1,000 00	
	$132,592 83	$1,036 79	$1,036 79
Unused of unforeseen	948 38	.....	$948 38
Total expenditure from Revenue, 1902-3	$131,644 45		

Details of Revenue Expenditure, 1902-3.

	Estimate.	Expenditure.
Salaries, (see Appendix 5)	$90,782 00	$90,058 68
Pensions	1,883 33	1,883 33
Bursar's Office :		
Stationery, postage, printing and incidentals	450 00	442 62
Auditor	300 00	300 00
	$750 00	742 62
Registrar's Office :		
Stationery and Office Supplies	$350 00	$391 38
Postage	550 00	530 00
Printing, other than Calendar	300 00	154 06
Printing, Calendar and Curricula (2 years)	1,800 00	1,681 00
	$3,000 00	$2,756 44
Vice-Chancellor's Office.		
Honorarium	400 00	400 00
Expense indemnity	350 00	270 00
	750 00	670 00
President's Office :		
Secretarial allowance	200 00	200 00
Postage and incidentals	50 00	82 73
Travelling expenses	200 00	164 00
	450 00	446 73
Law Costs	2,000 00	1,973 43
General incidentals, including commissions on real estate transactions.	1,500 00	1,500 00
Insurance	1,800 00	2,388 60
Telephones	325 00	297 50
Convocation expenses	500 00	899 25
Examinations :		
(a) Remuneration to examiners-		
Arts	850 00	763 10
Medicine	1,500 00	1,473 00
Law	150 00	40 00
Engineering and Applied Science	250 00	192 00
Dentistry	500 00	555 00
Agriculture	300 00	263 40
Music	250 00	605 50
Pharmacy	450 00	420 35
Pedagogy	100 000	40 00

	Estimate.	Expenditure.
Matriculation	100 00	85 00
Household Science		20 00
Physical Drill		12 00
	4,450 00	4,469 35
(b) Stationery and supplies	500 00	707 09
(c) Cost of printing examination papers and class lists, (2 years of latter)	2,000 00	1,793 20
	6,950 00	6,969 64
Less Government share for Departments of Chemistry and Physics	325 00	325 00
	$6,625 00	$6,644 64
Library—		
(a) Maintenance :		
Fuel	$450 00	$432 27
Water	25 00	21 16
Cleaning	175 00	175 00
Repairs and incidentals	150 00	81 60
	$800 00	$710 03
(b) Customary grant for books	2,600 00	2,600 00
Grounds—		
Labour, tools, gravel, etc.	$3,000 00	$2,993 24
Main Building—		
Extraordinary expenditure, including repairing building and restoration of tower	$1,600 00	$1,597 35
Repairs (including carpentry and plumbing) and sundries	2,200 00	2,197 97
Fuel	2,400 00	2,362 86
Water	300 00	401 48
Gas and electric light	450 00	581 50
	$6,950 00	$7,141 16
Less Government share for Department of Physics	2,000 00	2,000 00
	$4,950 00	$5,141 16
Biological Building—		
(a) Maintenance of Structure :		
Fuel	$1,000 00	$877 56
Gas and electric light	275 00	221 17
Water	150 00	112 91
House furnishings and cleaning materials	250 00	266 70
Repairs, including carpentry and plumbing	325 00	324 17
Aditional attendance and cleaning assistance	300 00	293 15
	$2,300 00	$2,055 75
Less Government share for Department of Mineralogy and Geology	100 00	100 00
	$2,200 00	$1,955 75

	Estimate.	Expenditure.
Biological Department—		
Laboratory and lecture rooms supplies	300 00	299 92
Museum supplies	350 00	349 12
Marine and lake laboratories	200 00	200 00
Students' laboratory supplies	784 00	784 00
Assistance in preparation of catalogue	250 00	250 00
New microscopes	250 00	250 00
	$2,134 00	$2,133 04
Physiological Department—		
Maintenance, apparatus, etc.	$600 00	600 00
Students' laboratory supplies	212 00	212 00
	$812 00	$812 00
Psychological Department—		
Maintenance	300 00	299 96
Mathematics	76 50	52 49
Political Science—		
Class room supplies	100 00	60 01
History—		
Class room supplies	50 00	149 28
Italian and Spanish—		
Class room supplies	20 00	20 00
Advertising	400 00	525 65
Incidentals	200 00	191 02
University College Departments:		
Classics—		
Greek class room supplies	130 00	128 90
Latin class room supplies	25 00	5 00
English—		
Class room supplies and provision for reading essays	100 00	100 00
French—		
Class room supplies	30 00	26 65
German—		
Class room supplies	30 00	26 65
Oriental Literature—		
Class room supplies	25 00	25 60
Stationery	75 00	44 32
Printing	75 00	40 69
Advertising	100 00	46 22
Incidentals	150 00	134 00
Gymnasium and Students' Union—		
Fuel	40 00	350 57
Water	140 00	125 14
Gas	100 00	67 74
Cleaning	90 00	81 91
Repairs and incidentals	150 00	153 89
Apparatus, labour, etc.	200 00	137 50
	$1,080 00	$916 75

	Estimate.	Expenditure.
Educational Council Reception		249 92
Conversazione, Grant towards		150 00
Renovation of Y.M.C.A. building		159 00
Vaccination expenses—		
Physicians' charges	425 00	445 00
Vaccine, etc.	140 00	139 55
	$565 00	$584 55
University Press—		
Portion of $2,000 remaining to be provided for cost of presses and type	$500 00	$500 00
Additions to type and equipment	500 00	432 97
Incidental expenses	200 00	188 08
	$1,200 00	$1,121 05

SCHEDULE 6.

Site Lands, Buildings and Contents.

30th June, 1903.

Lands set apart for the use of the University	$475,361 40	
Main building and residence	450,000 00	
Museum building	73,085 42	
Biological building	56,659 88	
Library building	110,015 65	
Chemical building	77,469 88	
Gymnasium building	36,288 46	
Medical building	125,000 00	
Y. M. C. A. Hall	1 00	
		$1,403,881 69
Library books, etc	127,409 36	
Museum, including fittings and biological apparatus	24,691 02	
Chemical apparatus	9,975 90	
Mineralogical and geological apparatus	8,212 16	
Physical apparatus	15,900 00	
Psychological apparatus	1,800 00	
Mathematical apparatus	600 00	
Fittings and equipment new medical building	23,600 00	
		$212,188 44
Main building furniture	$3,841 20	
Residence furniture	1,537 49	
		$5,378 69
		$1,621,448 82
Return of 30th June, 1902	$1,470,675 29	
Additions to library during year	6,114 02	
New medical building	125,000 00	
Equipment thereof	23,600 00	
	$1,625,389 31	
Yearly allowance for depreciation of library	3,940 49	
		$1,621,448 82

SCHEDULE 7.

Unproductive Lands.

Hoskin Avenue and Devonshire Place survey	$176,356 70	
Unsurveyed land east of Devonshire Place survey	217,657 53	
Block 131 feet s. s. Bloor by 200 feet on e. s. North Drive	31,251 00	
Lots 51, 52 and 54, s. s. Bloor, west of North Drive	44,398 50	
Lots on College Avenue, Nos. 3, 6, 8 and 9	36,864 00	
Lots in Port Hope	7,100 00	
Lots near Belleville	1,790 00	
Farm lands	152 00	
College block, King Street, Toronto, unsold	262,375 40	
		$777,945 13

Transactions during 1902-1903.

Sales of portions of College block in five parcels, 315 feet frontage, averaging 186 feet deep, for	$42,225 00	
Return of 30 June, 1902	820,170 13	
		$777,945 13

SCHEDULE. 8.

Leased Lands.

Victoria College site	$ 1 00	
Wycliffe College site	2,500 00	
Observatory site	1 00	
School of Science site	18,500 00	
Land leased to City of Toronto	120,000 00	
Park lands	239,080 00	
Toronto business properties	78,038 10	
Caradoc farm	2,000 00	
Cavan farm	4,500 00	
Valuation of lands		$ 464,620 10
St. George Street house and land	$ 8,031 85	
Cumberland house and land	14,842 75	
Park hospital building	24,982 16	
		47,856 76
Wycliffe College pavement		1,165 10
Park and business ground rents :—		
Past due	$ 493 25	
Accrued but not due, park rentals	6,412 78	
City of Toronto payment	1,500 00	
Business ground rents, accrued but not due	808 84	
		9,214 87
		$ 522,856 83

Note.

Pembroke Street property sold	4,778 39	
Wycliffe pavement instalment	31 91	
Decrease in revenue outstanding	415 32	
Reductions during 1902-3	5,225 62	
Return of 30 June, 1902	528,082 45	
		$ 522,856 83

SCHEDULE 9.

Investments, 30th June, 1903.

Debentures and municipal bonds	$ 288,829 16	
Interest accrued but not due	5,711 25	
		$ 294,504 41
Loans accrued by mortgages upon real property	276,004 31	
Advanced as premiums on fire policies	73 57	
Interest past due	830 43	
Interest accrued but not due	4,095 83	
		$ 281,004 14
Unpaid purchase money on land sales	152,049 15	
Interest past due	636 75	
Interest accrued but not due	1,289 80	
		153,975 70
		$ 729,520 25
Cheques to be received from the Provincial Treasury	18,814 37	
Canadian Bank of Commerce, on deposit 30th June, 1903	29,444 39	
University Press earning, unpaid	285 27	
		48,544 03
		$ 778,064 28

Transactions 1902-3

Inwards.

Debentures paid off	$ 13,104 52	
Loans repaid	46,996 96	
Purchase money payments	8,230 99	
Decreased revenue account outstanding	961 01	
Withdrawals from the Canadian Bank of Commerce	336,875 50	
		406,168 98

Outwards

Debentures purchased	$ 11,273 45	
Mortgage re-investment	3,528 00	
Land sales	47,741 96	
Deposits in Canadian Bank of Commerce	233,691 01	
To be deposited :—		
Accounts receivable $ 285 27		
Cheque of Provincial Treasurer 4,144 90		
Cheque of Provincial Treasurer 14,669 47		
	19,099 64	
		315,334 06
Decrease in volume during year		$ 90,834 92
Return of 30th June, 1902		868,899 20
Return of 30th June, 1903		$ 778,064 28

SCHEDULE 10.

Fees

Actual receipts during 1902-3			$ 54,350 18
Deduct arrears of 30th June, 1902, collected and included in above amount	$ 46 22		
Registration fee written off	13 00		
3 Library fees written off	6 00		
Laboratory fee written off	2 00		
		$	67 22
		$	54,282 96
Add arrears of 30th June, 1903 (see note below)			84 12
Fees of 1902-3		$	54,367 08

Note.

Arrears of 30th June, 1903 :			
Agricultural arrears on 30th June, 1902	$ 46 22		
Examination outlay, 1902-3	263 40		
15 Degrees	150 00		
	$ 459 62		
Received from Department of Agriculture	$425 00		
1 Examination fee paid direct	10 00		
	435 00		
		$	24 62
3 Registration fees			15 00
5 Library fees			10 00
1 Penalty			2 00
1 Examination fee			14 00
11 Laboratory supply fees			18 50
Arrears of 30th June, 1903		$	84 12

APPENDIX 2.

Fees Received 1902-3.

Faculty of Arts.

Subject.	1st year.	2nd year.	3rd year.	4th year.	Miscellaneous.
College fees	$5,290	$4,053	$3,831	$3,721	$50
Penalties	22	19	17	22	.....
Dispensations and post graduate registration	.....	20	35	35	55
Honor Certificates	.....	.....	.....	1	62
Matriculation	40	15	.....	.....	661
Ad Eundem	10	40	.....	.....	30
Examination	2,796	3,190	2,876	2,329	777
Degrees	.....	.....	.....	1,440	480
Chemical supply	76	97	119	57	.....
Mineralogical supply	.....	15	15	32	.....
Biological supply	76	57	130	169	.....
Physical supply	35	23	143	75	.....
Psychological supply	.....	.....	52	62	.....
Library	424	358	316	290	2
Medical Students:					
Matriculation	15	10	5	30	.....
Ad Eundem	.....	10	50	20	.....
Examination	880	1,240	1,330	1,170	270
Degrees	.....	.....	.....	1,840	80
Chemical supply	270	327	.....	.....	.....
Biological supply	135	302 50	.....	.....	.....
Physiological supply	.....	232	.....	.....	.....
Instruction to Medical Faculty in Arts Subjects	1,260	1,650	.....	.....	.....
Instruction to Practical Science Students	1,096	603	16	.....	.....
Totals	$12,425	$12,261 50	$8,935	$11,293	$2,467

Departmental Fees.

Subject.	Law.	Dentistry.	Engineering and applied Science.	Music.	Pharmacy.	Pedagog.
Matriculation	$140	$ 85			$255	
Examination	210	765	300	978	530	100
Practical Examination					106	
Degrees	80	825	190		530	10
Certificates		3		264		
Totals	$430	$1,680	$390	$1,242	$1,421	$110

Summary of 1902-3 Fees.

First year	$ 12,425 00	
Second year	12,261 50	
Third year	8,935 00	
Fourth year	11,293 00	
Miscellaneous	2,467 00	
Law	430 00	
Dentistry	1,680 00	
Engineering	390 00	
Music	1,242 00	
Pharmacy	1,421 00	
Pedagogy	110 00	
Agriculture	435 00	
Gymnasium	1,260 68	
		$ 54,350 18

Classification of Services.

College fees	$ 16,945 00	
Penalties	80 00	
Dispensations and post graduate registration	145 00	
Honor Certificates	332 00	
Matriculation	1,256 00	
Ad Eundem	160 00	
Examination	19,641 00	
Practical examination	106 00	
Degrees	5,475 00	
Chemical supply	946 00	
Mineralogical supply	62 00	
Biological supply	869 50	
Physiological supply	232 00	
Physical supply	276 00	
Psychological supply	114 00	
Library	1,390 00	
Instruction to Medical Faculty, Arts subjects	2,910 00	
Instruction to Practical Science students	1,715 00	
Agriculture	435 00	
Gymnasium	1,260 68	
		$ 54,350 18

APPENDIX 3.

Departments Maintained by the Government.

Summary.

	Estimate. 1902-3.	Expenditure 1902-3.
1. Chemistry.		
Salaries	$ 9,234 00	$ 9,175 75
Maintenance	4,000 00	3,906 85
2. Physics :		
Salaries	10,750 00	10,740 00
Maintenance	4,500 00	4,494 63
3. Mineralogy and Geology :		
Salaries	4,825 00	4,825 00
Maintenance	2,700 00	2,677 67
4. Examination expenses :		
Share of Chemistry and Physics	325 00	325 00
	$36,334 00	$ 36,144 90

Details.

1. Chemistry :		
(a) Salaries :		
(Details in Appendix 5)	$ 9,234 00	$ 9,175 75
(b) Maintenance of building :		
Fuel	650 00	578 73
Gas and electric light	200 00	278 87
Water	150 00	126 46
Cleaning	100 00	100 00
Repairs and incidentals	350 00	346 67
Fitting up physical chemical laboratory	250 00	254 56
Storage cells and blinds	500 00	504 50
Fitting up room as laboratory	300 00	310 04
	$2,500 00	$2,499 83
(c) Maintenance of department :		
Chemicals and glassware	$1,200 00	$1,112 64
Appropriation for sub-department of physical chemistry	300 00	294 38
	$1,500 00	$1,407 02
2. Physics :		
(a) Salaries :		
(Details in Appendix 5)	$10,750 00	$10,740 00
(b) Maintenance of department :		
Supplies, Apparatus, etc.	2,50 00	2,494 63
Proportions of fuel, water, light, cleaning, repairs and incidentals, Main Building account	2,000 00	2,000 00
	$4,500 00	4,494 63

	Estimate.	Expenditure.
3. Mineralogy and Geology:		
(a) Salaries:		
(Details in Appendix 5)	$4,825 00	$4,825 00
(b) Maintenance of department:		
Apparatus for Mineralogy	1,200 00	1,200 80
Apparatus for Geology	600 00	612 73
Supplies and sundries, including students' supplies	800 00	764 14
Proportions of fuel, light, water, cleaning, repairs and incidentals, Biological Building account	100 00	100 00
	$2,700 00	$2,677 67
4. Department of Chemistry and Physics:		
Share of examination expenses:		
Chemistry	$180 00	$180 00
Physics	145 00	145 00
	$325 00	$325 00

APPENDIX 4.

Medical Faculty Income.

First year	$9,108 00	
Less Arts portion	1,260 00	
		$7,848 00
Second year	$11,186 00	
Less Arts portion	1,650 00	
		$9,536 00
Third year		11,173 00
Fourth year		9,664 00
Miscellaneous fees		955 00
Registration fees		540 00
Psychological fees (collected for Dr. Daniel Clark)		465 00
Interest on bank account		433 49
Receipts during 1902-3		$40,614 49

Expenditures.

Salaries (details in Appendix 5)		$26,223 15
Rents of:		
Biological building	$1,900 00	
Gerrard Street building	1,000 00	
		2,900 00
Interest on University advance re Pathological Department	96 00	
Repayment of part of advance (Balance due $800)	1,600 00	
		1,696 00
Interest on cost of new building and fittings		1,903 05
Working expenses		7,892 29
		$40,614 49

APPENDIX 5.

Salaries—Summary.

Year Ending 30th June, 1903

University of Toronto :		
Departments sustained by Government		$24,740 75
University Departments other than above	$39,485 00	
University College Departments	35,425 00	
Administration and general service	15,148 68	
		90,058 68
Medical Faculty		26,223 15
Total of salaries for year		$141,022 58

DETAILS.

Salaries. Departments Sustained by Government.

Chemistry.

W. R. Lang	Professor	$2,700 00	
W. Lash Miller	Associate Professor	2,000 00	
F. B. Allan	Lecturer	1,175 00	
F. B. Kenrick	Lecturer	1,175 00	
Miss C. C. Benson	Assistant	500 00	
C. M. Carson	Assistant	500 00	
Dr. A. Tingle	Junior Assistant	250 00	
G. E. Smith	Junior Assistant	218 75	
E. Redpath	Caretaker and Attendant	504 00	
W. Sullivan	Boy cleaner, etc.	45 00	
J. Smith	Boy cleaner, etc.	108 00	
			9,175 75

Physics.

James Loudon	Professor	3,200 00	
W. J. Loudon	Associate Professor	1,800 00	
J. C. McLennan	Associate Professor	1,800 00	
C. A. Chant	Lecturer	1,800 00	
J. S. Plaskett	Mechanician	1,000 00	
G. R. Anderson	Laboratory Assistant	750 00	
E. F. Burton	Lecture Assistant	370 00	
W. H. Day	Temporary Assistant	20 00	
			10,740 00

Mineralogy and Geology.

A. P. Coleman	Professor of Geology	$600 00	
T. L. Walker	Professor of Mineralogy, etc.	2,575 00	
W. A. Parks	Lecturer	1,350 00	
Wm. Stewart	Attendant	300 00	
			4,825 00
Paid by Provincial Government			$24,740 75

SALARIES, UNIVERSITY AND UNIVERSITY COLLEGE.

Excluding Departments Sustained by Government.

1. Faculty, University of Toronto.

D. James Loudon	President	$2,300 00	
Dr. R. Ramsay Wright	Vice-President (from 1st Oct., 1901)	525 00	
			$2,825 00

Modern History and Ethnology.

Geo. M. Wrong	Professor	3,200 00	
			3,200 00

Political Science.

James Mavor	Professor	3,200 00	
McGregor Young	Prof. of Constitutional and International Law	1,500 00	
A. H. F. Lefroy	Prof. of Roman Law, Jurisprudence, etc.	750 00	
S. M. Wickett	Lecturer	1,000 00	
			6,450 00

Mathematics.

Alfred Baker	Professor	$3,200 00	
A. T. DeLury	Associate Professor	1,800 00	
J. C. Fields	Special Lecturer	1,000 00	
E. F. Burton	Fellow	500 00	
			6,500 00

Biology.

R. Ramsay Wright	Professor	$3,200 00	
B. A. Bensley	Lecturer Zoology, etc.	1,300 00	
W. H. Piersol	Lecturer Biology, etc.,	1,000 00	
E. C. Jeffrey	Former Lecturer (to Oct. 1st, 1902)	450 00	
J. H. Faull	Lecturer (from 1st Oct., 1902)	750 00	
R. B. Thomson	Instructor	500 00	
C. M. Fraser	Lecture Assistant, etc	250 00	
A. H. Adams M. H. Embree A. C. Hendrick W. J. McCollum E. A. McCulloch G. W. Ross	Class Assistants at $50	300 00	
A. Pride	Sub-Curator of Museum	750 00	
D. J. Clark	Attendant and Caretaker	500 00	
W. Harris	Boy Attendant, &c	135 00	
			9,135 00

Physiology.

A. B. McCallum	Professor	$2,500 00	
F. H. Scott	Demonstrator	1,000 00	
			3,500 00

Italian and Spanish.

W. H. Fraser	Professor	$2,500 00	
E. J. Sacco	Instructor, Italian	400 00	
F. T. A. Davidson	Instructor, Spanish	200 00	
			$3,100 00

Philosophy.

August Kirschmann	Associate Professor of Philosophy	$2,000 00	
Frederick Tracy	Lecturer	1,575 00	
A. H. Abbott	Instructor and Laboratory Assistant	1,000 00	
Miss M. Downing	Laboratory Assistant	200 00	
			4,775 00
			$39,485 00

2. Faculty, University College.

Dr. M. Hutton	Principal	$300 00	
			$300 00

Ethics.

J. G. Hume	Professor	$3,200 00	
			3,200 00

Greek.

Maurice Hutton	Professor	$3,200 00	
A. Carruthers	Lecturer	1,800 00	
			5,000 00

Latin.

J. Fletcher	Professor	$3,175 00	
W. S. Milner	Lecturer	1,80 00	
G. W. Johnston	Lecturer	1,575 00	
			6,550 00

Oriental Literature.

J. F. McCurdy	Professor	$3,200 00	
R. G. Murison	Lecturer	1,575 00	
			4,775 00

English.

W. J. Alexander	Professor	$3,200 00	
D. R. Keys	Lecturer	1,800 00	
			5,300 00

French.

John Squair	Professor	$2,500 00	
J. H. Cameron	Lecturer	1,800 00	
St. Elme de Champ	Instructor	1,000 00	
			5,300 00

German.

W. H. Vandersmissen	Professor	$2,500 00	
G. H. Needler	Lecturer	1,800 00	
P. Toews	Instructor	1,000 00	
			5,300 00
			$35,425 00

3. Administrative Departments and General Service.

Bursar's Office.

J. E. Berkeley Smith	Bursar	$2,000 00	
F. A. Moure	Accountant	1,300 00	
H. J. Bolitho	Fees Clerk	600 00	
			$3,900 00

Registrar's Office.

James Brebner	Registrar	$1,800 00	
Miss A. W. Paterson	Stenographer	400 00	
			2,200 00

Library.

H. H. Langton	Librarian	$2,000 00	
Miss M. H. Buchan	1st Assistant	500 00	
Miss F. B. Arnoldi	2nd Assistant	500 00	
Miss Hester Young	3rd Assistant (Cataloguer), 4 months	166 68	
Miss E. A. McMicking	3 months' assistance before appointment of Cataloguer	125 00	
Miss G. Buchan	Temporary assistance to Cataloguer	35 00	
Miss A. Rosebrough	Delivery Clerk	280 00	
Miss G. Buchan	Delivery Clerk	100 00	
S. H. Fussell	Caretaker	500 00	
			$4,206 68

Gymnasium.

A. Williams	Instructor	$800 00	
George Hare	Caretaker	576 00	
W. G. Wood	Secretary Athletic Association	200 00	
			1,576 00

General Service.

D. B. Dick	Architect	$100 00	
Robt. Martin	Bedel (with free house)	600 00	
F. Hanmer	Engineer (with house and fuel)	576 00	
Wm. Cook $8 75			
A. McConnell ... 271 25			
———	Firemen	280 00	
J. Wicksey	Carpenter, &c.	620 00	
C. E. Bradshaw	Janitor	450 00	
J. Laballister and wife	Cleaners of Building	480 00	
S. White	Boy messenger	160 00	
			3,266 00
			$15,148 68

MEDICAL FACULTY.

Professors.

Dr. A. Primrose	Anatomy	$1,500 00	
Dr. J. J. Mackenzie	Pathology	1,500 00	
I. H. Cameron	Surgery and Clinical	1,400 00	
Dr. A. McPhedran	Medicine and Clinical Medicine	1,140 00	
Dr. W. Oldright	Hygiene	1,140 00	
Dr. A. H. Wright	Obstetrics	1,140 00	
Dr. U. Ogden	Gynaecology	760 00	
Dr. J. M. MacCallum	Pharmacology and Therapeutics	760 00	
Dr. R. A. Reeve	Ophthalmology, etc.	456 00	
Dr. G. R. McDonagh	Laryngology, etc.	456 00	
Dr. W. H. Ellis	Toxicology	380 00	
			$10,372 00

Associate Professors.

Dr. G. A. Peters	Surgery and Clinical Surgery	$1,140 00	
Dr. G. H. Burnham	Ophthalmology	304 00	
Dr. H. W. Aikins	Anatomy	760 00	
Dr. W. P. Caven	Clinical Medicine	760 00	
Dr. H. A. Bruce	Clinical Surgery	608 00	
Dr. J. F. W. Ross	Gynaecology	608 00	
Dr. H. T. Machell	Obstetrics, etc.	319 20	
Dr. W. B. Thistle	Clinical Medicine, etc.	456 00	
Dr. F. N. G. Starr	Clinical Surgery, etc.	456 00	
Dr. J. A. Amyot	Pathology, etc.	456 00	
C. F. Heebner	Pharmacology	486 40	
			$6,353 60

Lecturers and Instructors.

Dr. R. D. Rudolf	Medicine and Clinical Medicine	$380 00	
Dr. R. J. Dwyer	Medicine and Clinical Medicine	380 00	
Dr. G. Boyd	Clinical Medicine	304 00	
Dr. A. R. Gordon	Clinical Medicine	304 00	
Dr. G. Chambers	Clinical Medicine	304 00	
Dr. C. L. Starr	Clinical Surgery	304 00	
Dr. W. McKeown	Clinical Surgery	304 00	
Dr. G. Silverthorne	Medical Jurisprudence (special arrangement for this year)	175 00	
			$2,455 00

Demonstrators and Assistant Demonstrators.

Dr. F. N. G. Starr	Anatomy	$ 150 00	
Dr. W. J. McCollum	Anatomy	150 00	
Dr. W. J. O. Malloch	Anatomy	150 00	
Dr. S. H. Westman	Anatomy	150 00	
Dr. E. R. Hooper	Anatomy	150 00	
Dr. W. J. Wilson	Anatomy	150 00	
Dr. C. L. Starr	Anatomy	150 00	

Dr. A. C. Hendrick.....	Anatomy..	100 00	
Dr. A. J. Mackenzie....	Anatomy....	100 00	
Dr. D. McGillivray.....	Anatomy..	100 00	
Dr. W. Goldie.....	Clinical Medicine	175 00	
Dr. G. Silverthorne.....	Pathology, etc.	150 00	
Dr. C. J. Wagner.....	Pathology, etc.	150 00	
Dr. T. D. Archibald.....	Pathology, etc.	250 00	
Dr. M. M. Crawford.....	Pathology, etc.....	100 00	
Dr. F. A. Clarkson.....	Pathology, etc.	50 00	
Dr. K. C. McIlwraith..	Obstetrics	175 00	
Dr. C. H. Montgomery.	Assistant Clinical Laboratory..	250 00	
			$2,650 00

General Service.

Dr. A. Primrose	Secretary to Faculty	$1,200 00	
Dr. J. J. Mackenzie....	Assistant Secretary	100 00	
Dr. J. J. Mackenzie.....	Curator of Museum	500 00	
Thos. Mutton.....	Janitor and Caretaker at Medical School Building	720 00	
George Lynne'.....	Attendant and Caretaker at Anatomical Department	660 00	
John Anderson.....	Additional Attendant....	344 70	
G. Dunkin.....	Temporary Attendant	31 50	
H. Crombie.....	Boy Messenger and attendant	121 35	
			$3,677 55

Miscellaneous.

Dr. Daniel Clark.....	Psychology fees collected for him. ..	$465 00	
Dr. J. H. Richardson....	Honorarium as retired professor	250 00	
			715 00
(Medical Faculty) Total			$26,223 15

APPENDIX 6.

University of Toronto and University College.

Analysis of Expenditure for the Year Ending 30th June, 1903

University.

Cost of Administration relative only to University .. .		$90,489 72
Less 1. University Fees.....	$34,691 40	
2. Cost of three departments maintained by the Government	36,144 90	
3. City Grant for one Chair..	3,000 00	
	73,836 30	
Portion to be derived from General Income...		$16,653 42

University College.

Cost of Administration relative only to University College		$35,983 33	
Less 1. College fees	$17,025 00		
2. City grant for one Chair	3,000 00		
		20,025 00	
Portion to be derived from General Income			$ 15,958 33

General Income.

1. From Endowment	$56,284 33		
2. Regular grant from Government	7,000 00		
3. Wild Lands sales applicable as Revenue	2,014 76		
4. General fees (Gymnasium and Library)	2,650 68		
5. Deficit to be paid by Government	14,669 47		
	$82,619 24		
Less interest on trust funds reserved	8,691 19		
		$73,928 05	
Cost of General Administration		41,316 30	
Balance of General Income			$32,611 75

Proportion of General Income needed for

University $16,653 42 equal to 51.07 per cent.

College 15,958 33 equal to 48.93 per cent.

$32,611 75

TWENTY-NINTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE

AND

EXPERIMENTAL FARM

1903.

(*PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.*)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO.

TORONTO:
PRINTED BY L. K. CAMERON,
Printer to the King's Most Excellent Majesty.
1904.

WARWICK BRO'S & RUTTER, PRINTERS,
TORONTO.

TWENTY-NINTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE.

AND

EXPERIMENTAL FARM

FOR THE YEAR 1903.

GUELPH, December 31ST, 1903

To the Honorable JOHN DRYDEN,

Minister of Agriculture :

SIR,—I have the honor to transmit herewith the Twenty-ninth Annual Report of the Ontario Agricultural College and Experimental Farm.

In this Report the work of the year 1903 has been briefly reviewed under the following heads :

PART I. REPORT OF PRESIDENT.

PART II. REPORT OF DEAN OF RESIDENCE.

PART III. REPORT OF PROFESSOR OF PHYSICS AND LECTURER IN ENGLISH.

PART IV. REPORT OF PROFESSOR OF BIOLOGY AND GEOLOGY.

PART V. REPORT OF PROFESSOR OF CHEMISTRY.

PART VI. REPORT OF LECTURER IN CHEMISTRY.

PART VII. REPORT OF PROFESSOR OF VETERINARY SCIENCE.

PART VIII. REPORT OF PROFESSOR OF DAIRY HUSBANDRY.

PART IX. REPORT OF PROFESSOR OF AGRICULTURE AND FARM SUPERINTENDENT.

PART X. REPORT OF LECTURER IN AGRICULTURE.

PART XI. REPORT OF PROFESSOR OF HORTICULTURE.

PART XII. REPORT OF PROFESSOR OF BACTERIOLOGY.

PART XIII. REPORT OF DIRECTOR OF FIELD EXPERIMENTS.

PART XIV. REPORT OF MANAGER OF POULTRY DEPARTMENT.

PART XV. REPORT OF LECTURER ON APICULTURE.

PART XVI. REPORT OF LIBRARIAN.

PART XVII. REPORT OF THE PHYSICIAN.

I have the honor to be, Sir,

Your obedient servant,

JAMES MILLS,

President

THE ONTARIO AGRICULTURAL COLLEGE

AND

EXPERIMENTAL FARM, GUELPH, ONT.

HON. JOHN DRYDEN, Minister of Agriculture, Toronto, Ont

STAFF OF PROFESSORS, LECTURERS, AND DEMONSTRATORS.

— 1904 —

G. C. CREELMAN, B.S.A., M.S. ..... President
H. H. DEAN, B.S.A ..... Professor of Dairy Husbandry
C. A. ZAVITZ, B.S.A. ..... Director of Field Experiments
J. HUGO REED, V.S ..... Professor of Veterinary Science
G. E. DAY, B.S.A. ..... Professor of Agriculture and Farm Superintendent
H. L. HUTT, B.S.A. ..... Professor of Horticulture
J. B. REYNOLDS, B.A. ..... Professor of Physics and Lecturer in English
F. C. HARRISON, B.S.A., D.P.H ..... Professor of Bacteriology
W. LOCHHEAD, B.A., M.S. ..... Professor of Biology and Geology
R. HARCOURT, B.S.A. ..... Professor of Chemistry
W. R. GRAHAM, B.S.A. ..... Manager and Lecturer in Poultry Department
H. R. ROWSOME ..... Lecturer in Apiculture
W. P. GAMBLE, B.A ..... Lecturer in Chemistry
M. CUMMING, B.A., B.S.A. ..... Lecturer in Agriculture
J. W. HOTSON, M.A. ..... Lecturer in Biology
MISS ALICE ROWSOME, B.A ..... Assistant in Library and Instructor in French and German
F. H. REED ..... Dean of Residence and Instructor in English and Mathematics
T. D. JARVIS, B.S.A. ..... Demonstrator in Biology
E. G. DE CORIOLIS, B.S.A. ..... Demonstrator in Chemistry
H. S. PEART, B.S.A. ..... Demonstrator in Horticulture
W. H. DAY, B.A. ..... Demonstrator in Physics
B. BARLOW, B.S. ..... Demonstrator in Bacteriology
CAPTAIN W. CLARK ..... Instructor in Drill and Gymnastics

OFFICE STAFF.

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S. SPRINGER ..... Bursar
B. S. PICKETT ..... Secretary

STAFF OF INSTRUCTORS, MACDONALD INSTITUTE.

W. H. MULDREW, B.A., D. Paed. ..... Dean
MISS M. U. WATSON ..... Lady Principal
JOHN EVANS ..... Macdonald Instructor in Manual Training
MISS K. T. LYMAN, M.A. ..... Instructor in Science
MISS HELEN GIVIN ..... Instructor in Domestic Science
MISS HELEN HOLLAND ..... Assistant in Domestic Science

NOTE—Mr. Creelman succeeded Dr. Mills as President, Feb. 1, 1904.

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PART I.

REPORT OF THE PRESIDENT.

Agricultural Education in Canada.

Before proceeding to a detailed account of the year's work at the College, I may make a few observations on agricultural education in this country, which observations I hope may not be considered inappropriate to the occasion.

Agricultural Education may be spoken of as a plant, but a slow-growing plant, so far as the Dominion of Canada is concerned. This plant was set out in these Provinces many years ago; but through the opposition of those who were wedded to academic ideals in education, and the no less persistent but utterly unaccountable opposition of the farmers throughout the country, it was stunted at the beginning and not allowed to grow much for a long time. It struggled on, however, for a generation or more, till at length it became a respectable sapling; and now, I am pleased to say, it shows signs of becoming a large and valuable tree.

Apart from schools and colleges, we have had in this country a number of agencies which have assisted indirectly in the work of agricultural education,—agricultural papers and periodicals, agricultural societies, live stock and dairy associations, horticultural societies, farmers' institutes, and similar organizations. The influence exerted by these agencies is well understood; it varies in kind and degree, but always contributes towards education on practical lines.

Societies and Associations.

We have Agricultural Societies, a Dominion Horse Breeders' Association, a Cattle Breeders' Association, a Sheep Breeders' Association, a Swine Breeders' Association, Poultry Associations, Dairy Associations, a Fruit Growers' Association, a large number of Horticultural Societies, an Entomological Society—all receiving regular grants from the Provincial Legislature, holding annual meetings, delivering addresses, reading and discussing papers, and publishing annual reports for distribution among farmers.

The most notable advance in the work of our Agricultural Societies for some time has been the sending of expert judges to the fall fairs, to judge live stock and fruit, and give publicly the reasons for their awards for the benefit of those who may be present when the judging is done. This arrangement is working well and the results seem quite satisfactory.

Our Fruit Growers' Association publishes a monthly journal and has recently introduced the practice of holding series of orchard meetings for brief addresses and practical demonstrations in pruning and in spraying for the destruction of insects and fungous diseases. The meetings are arranged for by the Secretary of the Association, and there is no doubt that the move is a step in the right direction.

Fairs, Especially Our Winter Fairs.

We have township and county fairs all over the country, spending in the aggregate a large sum of money and in many instances with very questionable results. No doubt they show fairly well what can be done by the best practice of each locality in grain growing, root cultivation, stock raising, and fruit culture; but in order to secure a good or even a fair attendance at these fairs, the Directors not unfrequently introduce what they call "attractions," such as horse racing and various kinds of side shows in which fakirs and mountebanks vitiate the taste of our young people and turn their attention away from the real objects of the show. This is certainly to be regretted; and we are glad to notice signs of a determination to remove these objectionable features.

We have also several large annual fairs at central points, such as Halifax, St. John, Ottawa, Toronto, London, and Winnipeg. These and other fairs of the same class have considerable educational value,—especially the Industrial Fair of Toronto, which is said by some well-travelled Canadians, and not a few visitors from the United States, to be the best annual fair on this continent.

Further, within the last five or six years, we have held what we call Winter Fairs at Guelph in Western Ontario, Ottawa in Eastern Ontario, and Amherst in Nova Scotia. These fairs are held in large buildings erected for the purpose, and consist of exhibits of fat cattle, fat sheep, bacon hogs, dairy cows, and poultry. In each Winter Fair building, there is a slaughter house; a room for hanging, and examining, and comparing carcasses of beef, mutton, and pork; and a galleried auditorium for lectures and demonstrations, given, first, on the live animals after the prizes have been awarded, and subsequently on the carcasses of the animals that got the prizes,—both exhibited, examined, and discussed on the dais of the auditorium in the presence of large numbers of farmers, who observe, listen, and ask questions during the last four days of the show. The poultry also, living and dead,—usually a very large exhibit,—is judged, and both live and dead birds are then taken to the auditorium to be exhibited and discussed by experts in presence of the people.

In our judgment, these Winter Fairs have great educational value and do much to enlighten and improve the farmers of the country.

Travelling Dairies and Organized Instruction in Creameries and Cheese Factories.

In June, 1891, we started a Travelling Dairy in the Province of Ontario,—consisting of a span of carriage horses; a good spring waggon, with a regular carriage top in front, and a box for home dairying appliances, with a tarpaulin cover behind; a first-class butter maker; the necessary supply of utensils, and a good dairyman as lecturer in charge. We sent out one such dairy the first year, and three the second year, and we kept them at work for six years—from May to November each year—till the whole Province was covered. Nova Scotia has since sent out two similar dairies in charge of young women from our Guelph Dairy School, with two men to drive the teams and do the heavier and rougher part of the work. And I need scarcely say that the results in both Provinces have been eminently satisfactory. There has been a marked improvement in the quality of the butter, both in hotels and in private houses, throughout these Provinces; much more butter is consumed, and higher prices are paid for it.

For some years past, the Dairy Associations in the Province of Ontario have sent instructors regularly to creameries and cheese factories which desired the assistance of such instructors, and were willing to pay $5 each towards the expense, but recently the work has been taken over by the Minister of Agriculture for the Province, and the results are much more satisfactory. Acting through the Superintendent of Farmers' Institutes, the Minister appointed two of the best men he could get to organize and take charge of the work, one for the eastern part of the Province, and the other for the west. These men grouped into syndicates of 20 or 25 each those creameries and factories which desired instruction and were willing to pay $15 apiece for the year. They then selected their instructors, and sent one to each group—27 instructors, under two directors, to look after the work in 79 creameries and 600 cheese factories last season. Similar instruction is given in the Province of New Brunswick, and the results in both Provinces are most gratifying—a great improvement in the factories, especially in the matter of drainage, and cooler and more equable temperatures in the curing rooms; greater cleanliness; better methods; larger product from milk, and higher prices for butter and cheese. It is likely that most of the factories in the Province of Ontario will ask for instruction next year, as none of them can afford to fall far behind in the race.

Fruit Experiment Stations.

We have in the Province of Ontario eleven fruit experiment stations and two sub-stations for testing varieties of fruit,—their characteristic and intrinsic merits, the soils to which they are adapted, and the climatic conditions under which they may be expected to thrive. The stations are controlled by a Board of six persons,—the President of the Agricultural College, the Horticulturist of the Agricultural College, the Secretary of the Fruit Growers' Association, and three expert fruit growers elected annually by the Fruit Growers' Association. The organization is very simple and inexpensive. Instead of buying land, erecting buildings, and appointing employees in different localities, the Board selected reliable, wide-awake fruit-growers, who had good orchards or plantations at the various points at which it wished to make tests,—one for peaches, another for pears, a third for grapes, a fourth for apples, a fifth for plums, a sixth for cherries, a seventh for small fruits, an eighth for hardy apples, and so on, until it had covered fairly well the different soils and climatic conditions of the Province; and each of these chosen growers was asked—(1) to report carefully once a year, according to instructions submitted, on his specialty, say, peaches; (2) to report on all other fruits which he might be growing; and, (3) to plant, take care of, and report upon all varieties of his specialty which the Board might send him from time to time—on condition, first, that the Board would pay him a certain sum in cash, say, $150 to $175 a year, when his annual report was received and approved; and, second, that the varieties given him to test should become his property, with the privilege of removing after a given time all which might prove to be worthless. These stations are all visited once a year and reported upon by the College Horticulturist or Secretary of the Fruit Growers' Association.

In this way the Board managed to get on without any capital investment; it got quick returns, and in ten years it has done a large amount of valuable and instructive work for a small expenditure, varying from $2,600 to $3,100 a year,—including an allowance of $250 a year to our Secretary for writing and illustrating a description of "The Fruits of Ontario," to be published two years hence.

Dominion Experimental Farms.

We have five Dominion Experimental Farms under the directorship of Dr. William Saunders, of Ottawa, with a local staff to take charge and do the work on each farm. The Central Experimental Farm, at Ottawa, consists of 465 acres of land, equipped and manned for extensive experimental work in soil cultivation and crop growing; stock breeding, feeding, and management; poultry raising; beekeeping; dairying; fruit growing; the testing of ornamental shrubs and trees; chemical research; botanical and entomological investigations; plant breeding, etc.

The other four farms are located where they are most needed to test varieties of crops and conduct experiments in the different parts and conditions of the country,—one at Nappan, Nova Scotia, for the Maritime Provinces; one at Brandon, for Manitoba; one at Indian Head, for the North-West Territories; and another at Agassiz, for British Columbia.

Agriculture in Public Schools.

Agriculture is a subject on the fixed program of Public School studies in two Provinces of the Dominion,—for Forms IV. and V. of all rural Public Schools in the Province of Ontario, and for both Public and High Schools throughout the Province of Manitoba. In the North-West Territories, also, agriculture is a compulsory subject in all schools, including the Normal School.

Agriculture is now an optional subject in the schools of four Provinces—Quebec, British Columbia, New Brunswick, and Nova Scotia; but Nature Study lessons bear-

ing on agriculture form a part of the prescribed course of study for Public Schools in the two latter Provinces.

So far the difficulty has been with the teachers, as only a few of them are qualified to teach either agriculture or nature study; but this difficulty can be overcome by requiring the Normal Schools to give thorough courses of training in these subjects; and it is difficult ot understand why action on this line should be delayed by any Province which has placed both or either of these branches on the fixed program of studies for its Public Schools.

Dairy Schools.

We have six Dairy Schools in the Dominion,—three in the Province of Ontario, one in Quebec, one in New Brunswick, and one in Manitoba. These schools are well manned and fully equipped for giving the broadest and most thorough instruction and practical training in milk testing, butter-making, and cheese-making,—offering long and short courses, free of charge, for farmers' sons and daughters, and for professional buttermakers and cheesemakers from all parts of the Dominion.

Farmers' Institutes.

These organizations do college extension work, and when properly organized and well managed, their methods and work are the most effective means known to the people of this continent for stirring up, instructing, and benefiting the farming community. We have an excellent system of Farmers' Institutes in Canada, founded in the Province of Ontario, and afterwards extended to the other Provinces; and there is no doubt that the work done by them has contributed largely towards an improvement in the condition of Canadian farmers—a very marked improvement in material things, intelligence, and social standing.

Agricultural Schools and Colleges.

Canada is only beginning to realize that it is a country,—that it has a great future before it. Hence, it has only one Agricultural College, properly so called. There is an Agricultural School at Truro, Nova Scotia, which the Legislature of that Province is enlarging, with a view to make it a strong and successful college; the Province of New Brunswick is planning for a College of Agriculture at Fredericton; the Province of Quebec has a number of small Agricultural Schools, most of them in connection with church institutions; Manitoba has lately passed an Act to establish an Agricultural College in that Province; and the Province of Ontario has what is known as the Ontario Agricultural College and Experimental Farm, at Guelph. This College was founded by Act of the Provincial Legislature in the year 1873, and was opened in May, 1874, so it is now in its thirtieth year. It has a farm of 550 acres; commodious farm, dairy, poultry, and horticultural buildings; a good representation of cattle, sheep, swine, and poultry; a large garden, half a dozen greenhouses, an orchard, a lawn, and an arboretum for practical work in horticulture; a good dairy herd, with buildings and equipment for instruction and practical work in handling milk and cream, testing milk, making butter, and making cheese;; five laboratories,—physical, chemical, biological, bacteriological, and horticultural, and nearly all that is required in the way of class rooms and museums. To this there has recently been added a large and well-equipped department for instruction and practical training in Home Economics (or Domestic Science), Nature Study, and Manual Training.

In this College three things have been aimed at:

First and chiefly, to educate young men for work and life on the farm.

Second, to do experimental work, in order, if possible, to solve some of the problems that confront Canadian farmers.

Third, to lead and encourage farmers in outside undertakings, which from time to time seem likely to benefit the farming community; such, for instance, as the Farmers' Institutes, the Travelling Dairies, and the Fruit Experiment Stations.

This Guelph College has no department of mechanic arts,—a department which is the strongest and most largely attended in nearly all United States Agricultural Colleges; and Guelph did not admit women, except to the Dairy Department, until September, 1903.

It gives the following courses of study, with a large amount of practical training:

(1) A Two-year Course,—intended specially for work and life on the farm. In this course the departments of instruction and practical training are: English; elementary mathematics; the sciences bearing on agriculture; an outline of political economy; and with special emphasis always and everywhere from beginning to end, the practical subjects,—agriculture, live stock, dairying, and horticulture. This leads to the Associate Diploma, and is called the Associate Course.

(2) A Three-year Course. Those who reach a fixed standard in the theory and practice of the two-year course, and give promise of being good practical men, are allowed to take a third year's work, and write for a Specialist Certificate in Agriculture or Horticulture.

(3) A Four-year Course. Those who reach a higher standard in general scholarship and practical knowledge in the two-year course,—higher than that required for the three-year course,—may take two years additional work, and write for the B.S.A. degree.

(4) Short Courses. (1) A two-weeks' course in live stock and grain judging; (2) a three-weeks' creamery course; (3) a four-weeks' course in poultry raising; and (4) a twelve-weeks' course in dairying, including milk testing, butter-making, and cheese-making.

Of the College at Guelph, it may, I think, be truthfully said, "This one thing it does"—it runs everything on agricultural lines. It does not make Public School teachers; it does not make mechanics; it does not make professional men—it simply makes farmers. It has farm surroundings, an agricultural atmosphere, and agricultural enthusiasm; and of the young men who go there from the farm, 95 per cent. return to the farm with a training that will make them more progressive and successful workers, will give them an increased liking for farm life, and will beget in them a greater respect for farmers and farming, with a feeling that the man who works with both his hands and his head is not for that reason any less of a gentleman than the man who works with his head alone. During the fall term, just passed, there were 298 students in the regular course, and there will be about 350 in the short courses for the year.

A considerable amount of experimental work is done from year to year in the Live Stock, Dairy, Poultry, and Horticultural Departments at the College; and a good deal of time is devoted to research in the Physical, Chemical, Biological, and Bacteriological Laboratories; and Field Experiments are gone into on an extensive scale, including variety tests, etc., on the College farm, and co-operative work on something over 3,000 farms throughout the Province.

After long years of hard work the Ontario Agricultural College may, I think, fairly claim to have made Guelph the Mecca of Ontario farmers. The farmers go there in large numbers every year. The Farmers' Institutes, by correspondence with the President of the College, arrange from year to year to run farmers' excursions to the College in the month of June, at which time the farmers and their families visit the College in large numbers, varying from 25,000 to 30,000 a year for the last six or seven years.

At this stage one naturally asks, What are the results from these various agencies working together along the line of agricultural education? and the answer is:

1st. The farmers of this country are producing more per unit than formerly. For example, take the Province of Ontario. During the last ten years the population of this Province has remained stationary, and there has been little, if any, increase in the price of farm products; and, nevertheless, there has been a very large increase in the sums received for the agricultural products exported from the Province.

2nd. Our farmers are living better, getting more of the necessaries and comforts of life for their labor.

3rd. They are more intelligent. Evidence of this is seen in the fact that they are reading more than formerly, and are much more anxious for knowledge. It is seen also in the character of the discussions at the Farmers' Institutes.

4th. They are more refined, dress better, and look better than in days gone by.

5th. During the last fifteen years, there has been a general and clearly noticeable uplift of the farming community in this country. I have had ample opportunities for studying the situation in this Province; I have seen pretty much the same people —20,000 to 30,000 a year—for a number of years, and I have no hesitation in making the statement.

6th. Farmers are less inclined than formerly to apologize for themselves and their occupation; and their social standing is improving from year to year.

College Work in 1903.

There is nothing special to report regarding the routine work at the College during the past year. The different departments have been occupied pretty much as usual, but with an increased determination to extend the work of research on various lines,—due, no doubt, in some measure at least, to the growing desire of farmers all over the country for information and advice regarding soil cultivation, crop growing, the breeding and management of live stock, poultry raising, fruit growing, and the destruction of weeds, insects, and fungous diseases, etc.

The bulletins prepared by members of the College staff and published by the Department of Agriculture during the past year are as follows:

No. 126—"Peas and the Pea Weevil," by C. A. Zavitz and W. Lochhead.

No. 127—"Farm Poultry," by W. R. Graham.

No. 128—"The Weeds of Ontario," by F. C. Harrison and W. Lochhead.

No. 129—"Bacon Production," by G. E. Day.

No. 130—"Bacterial Content of Cheese Cured at Different Temperatures," by F. C. Harrison and W. T. Connell.

No. 131—"Ripening of Cheese in Cold Storage compared with Ripening in Ordinary Curing Room," by H. H. Dean and R. Harcourt.

No. 132—"Roup: An Experimental Study," by F. C. Harrison and H. Streit.

No. 133—"Present Condition of San Jose Scale in Ontario," by W. Lochhead.

Macdonald Buildings.

Early in the spring of 1903, the contractor commenced work on what are known as the Macdonald buildings—Macdonald Institute, and Macdonald Hall. The former is to furnish long and short courses in Home Economics (or Domestic Science), Nature Study, and Manual Training,—all three for teachers, male and female, and the Home Economics for farmers' daughters and other young women who desire to learn the theory and practice of cooking, ventilation, general housekeeping, laundry work, sewing, dressmaking, millinery, home decoration, etc. The latter is a woman's residence, or a large and well-equipped building in which the young women who come to take any of the courses can have good board, lodging, etc., on easy terms, and under proper oversight, during their stay at the College.

The Institute is a fine building of red pressed brick, with terra-cotta trimmings,—large and imposing in its general outline, commodious in its internal arrangement, and

elegant as regards the quality and finish of the inside woodwork. The Hall (which will be ready for use in September next) will also be a large and imposing brick building, with stone trimmings and of the Elizabethan style of architecture. It will be well furnished, and will provide a very comfortable home for 107 young women, some in single rooms and others in double rooms, with single iron beds.

Students in Attendance.

The total number of students registered for work at the College in 1903 was 728, as follows :

General Course	299
Specials in General Course Work	23
Dairy Courses	114
Short Course in Stock and Grain Judging	216
Second Short Course in Stock and Grain Judging	35
Short Course in Poultry Raising	11
Nature Study, Short Course during May and June	9
Macdonald Institute, Regular Course	21
Total in all courses	728

Analysis of College Roll (General Course, 1903).

1. From Ontario.

Brant	10	Huron	8	Prescott	2
Bruce	8	Lambton	4	Prince Edward	3
Carleton	2	Lanark	5	Renfrew	2
Dufferin	6	Leeds	3	Russell	2
Dundas	8	Lincoln	8	Simcoe	9
Durham	4	Middlesex	7	Stormont	2
Elgin	11	Muskoka	3	Victoria	1
Essex	5	Norfolk	2	Waterloo	3
Frontenac	1	Northumberland	2	Welland	1
Grenville	1	Ontario	3	Wellington	11
Glengarry	3	Oxford	5	Wentworth	11
Grey	8	Parry Sound	1	York	12
Halton	3	Peel	3	Toronto	12
Hastings	6	Perth	4	Total	205

2. From Other Provinces of the Dominion.

Manitoba	2	Nova Scotia	15	Assinboia	2
British Columbia	3	P. E. I.	2		
New Brunswick	5	Quebec	13		42

From Other Countries.

Argentine	19	Grenada	1	Sweden	1
Asia Minor	1	India	1	United States	10
Australia	1	Jamaica	5	Uruguay	1
Austria	1	Mauritius	1		
Brazil	1	Scotland	1		52
England	7	Spain	1		

Total in General Course	299
Total in General and Dairy Courses	413
Total in all courses	728

Ages and Religious Denominations.

The limits of age of students in the General Course, 1903, ranged from 16 to 49 years. The average age was 20. The religious denominations were represented as follows :

General Course—87 Presbyterians, 86 Methodists, 52 Episcopalians, 26 Roman Catholics, 24 Baptists, 8 Disciples, 4 Congregationalists, 2 Friends, 2 Lutherans, 2 Mennonites 1 Christadelphian, 1 Christian Association, 1 Greek Orthodox, 1 New Jerusalem. United Brethren, 1 Universalist,—290.

Dairy Course—41 Methodists, 39 Presbyterians, 13 Episcopalians, 7 Baptists, 7 Roman Catholics, 2 Congregationalists, 2 Disciples, 1 Friend, 1 Latter Day Saint, 1 no church.—114.

Counties Represented in 1903.

It will be noted in the analysis of the College Roll that 40 Ontario counties and districts were represented in the General Course in 1903. There were 12 from York, 11 each from Elgin, Wellington, and Wentworth; 10 from Brant, 9 from Simcoe, 8 each from Bruce, Dundas, Grey, Huron, and Lincoln; 7 from Middlesex; 6 each from Dufferin, and Hastings; 5 each from Essex, Lanark, and Oxford; and smaller numbers from other counties.

Bachelors of Science of Agriculture.

The examinations for the degree of B.S.A. were held in the month of May, and the successful candidates, sixteen in number, received their dgrees at the commencement exercises of the University in June. The list was as follows:

Broderick, F. W.....St. Catharines, Lincoln, Ont.
De Coriolis, E. G.....Forest Side, Mauritius.
Eftyhithes, B. M.....Erekley at Iconium, Asia Minor.
Elderkin, D. T.....Amherst, Nova Scotia.
Galbraith, D. H.....Ellesmere, York, Ont.
Ketchen, A. P.....Brucefield, Huron, Ont.
Klinck, L. S.....Victoria Square, York, Ont.
La Pierre, L. A.....Paris, Brant, Ont.
McDonald, W. T.....Teeswater, Bruce, Ont.
Newman, L. H.....Andrewsville, Lanark, Ont.
Peart, H. S.....Nelson, Halton, Ont.
Rivara, J. B.....Buenos Ayres, Argentine Republic.
Rive, H.....Guelph, Wellington, Ont.
Rutherford, W. J.....South Mountain, Dundas, Ont.
Sharp, T. H.....Spanishtown, Jamaica.
Silcox, F. H.....Iona, Elgin, Ont.

Recipients of Associate Diplomas.

The following 36 students, having completed the Two-year Course, received Associate Diplomas in the usual way:

Albright, W. D.....Beamsville, Lincoln, Ont.
Baker, R. G.....Swathmore, Penn., U. S. A.
Barberree, G. L.....Corwhin, Halton, Ont.
Bell, H. G.....Orangeville, Dufferin, Ont.
Bower, J. E.....Harriston, Wellington, Ont.
Brereton, F. E.....Bethany, Durham, Ont.
Bustamante, D.....Jujuy, Argentine Republic.
Cameron, R. R.....Ailsa Craig, Middlesex, Ont.
Cohoe, W. J.....New Durham, Oxford, Ont.
Craig, J.....Glasgow, Scotland.
Davison, J. H.....Starrat, Parry Sound, Ont.
Eddy, E. D.....Scotland, Brant, Ont.
Esmond, C. W.....Blessington, Hastings, Ont.
Evens, J.....Randolph, Simcoe, Ont.
Granel, J.....Buenos Ayres, Argentine Republic.
Groh, H.....Preston, Waterloo, Ont.
Ketchen, A. P.....Brucefield, Huron, Ont.
Ledrew, H. H.....Toronto, York, Ont.
Leitch, A.....Cornwall, Stormont, Ont.
Lennox, W. J.....Newton Robinson, Simcoe, Ont.
McCaulay, J. W.....Winnipegosis, Manitoba.
McDonald, D. J.....Crawford, Grey, Ont.

MacRae, C. M.....Cumberland, Russell, Ont.
McFadyen, H.....Caledon, Peel, Ont.
McKillican, W. C.....Vankleek Hill, Glengarry, Ont.
Martinez, K. C.....Santa Fe, Argentine Republic.
Murray, R. S.....Toronto, York, Ont.
Panelo, F.....Buenos Ayres, Argentine Republic.
Pearce, S. M.....Iona, Elgin, Ont.
Reed, F. H.....Georgetown, Halton, Ont.
Rutherford, W. J.....South Mountain, Dundas, Ont.
Scott, P.....Waubuno, Lambton, Ont.
Taylor, F.....Cumberland Mills, Quebec.
Teeple, H.....Jaffa, Elgin, Ont.
Westover, C. A.....Frelighsburg, Quebec.
Winter, H.....Wicklow, Northumberland.

First-Class Men

The work of the College is divided into departments, and all candidates who obtain an aggregate of seventy-five per cent. of the marks allotted to the subjects in any department are ranked as first-class men in that department. The following list contains the names of those who gained a first-class rank in the different departments at the examinations in 1903, arranged alphabetically :

First Year.

Bracken, J., Seeley's Bay, Leeds, Ont., in four departments : English and Mathematics ; Physical Science ; Biological Science ; Agriculture.

Ballantyne, R., Sebringville, Perth, Ont., in one department : Biological Science.

Colwell, H. H., Toronto, Ont., in two departments : English and Mathematics ; and Physical Science.

Hamilton, C., Dundela, Dundas, Ont., in one department : Biological Science.

Hart, F. C., Wallace Bay, N.S., in two departments : Physical Science ; Biological Science.

McMillan, H. R. Aurora, York, Ont., in two departments : English and Mathematics; Biological Science.

Munro, J. F., South End, Welland, Ont., in one department ; Biological Science.

Stayner, H. S., Toronto, Ont., in one department : Biological Science.

Tucker, H. S. Chapman, Hastings, Ont., in one department : Biological Science.

White, G. G., Perth, Lanark, Ont., in one department : Biological Science.

Second Year.

Albright, W. D., Beamsville, Lincoln, Ont., in one department : English and Economics.

Bower, J. E., Harriston, Wellington, Ont., in one department : English and Economics.

Bustamante, D., Jujuy, Argentine, in one department : Biological Science.

Craig, J., Glasgow, Scotland, in one department : English and Economics.

Deachman, R. J., Gorrie, Huron, Ont., in one department : English and Mathematics.

Esmond, C. W., Blessington, Hastings, Ont., in two departments : English and Economics ; Physical Science.

Howitt, J. E., Guelph, Wellington, Ont., in three departments : English and Economics, Physical Science, Biological Science.

McKellican, W. C., Vankleek Hill, Prescott, Ont., in one department : English and Economics.

Wade, R. W., Smithville, Lincoln, Ont., in one department : English and Economics.

Scholarships.

Scholarships of $20 each in money were awarded for groups of subjects in first-year work, as follows : Highest standing, with a minimum of forty per cent. of the marks

for each subject, and an aggregate of seventy-five per cent. of the total number of marks allotted to the subjects in the group :

I. English, Mathematics, Bookkeeping, and Drawing—H. R. McMillan, Aurora, York Ont.

II. Physics, Chemistry, and Geology—F. C. Hart, Halifax, N.S.

III. Botany, Zoology, and Horticulture—R. Ballantyne, Sebringville, Perth, Ont.

IV. Agriculture, Dairying, Poultry, Apiculture, and Veterinary Science—W. D. Albright, Beamsville, Lincoln, Ont.

Prizes.

Prizes were given, each $10.00 in books, as follows :

1. Essay on "George Eliot as a Novelist and a Writer of English Prose"—J. Craig, Glasgow, Scotland.

2. First in general proficiency on first and second year work, theory and practice,—W. D. Albright, Beamsville, Lincoln, Ont.

Governor-General's Silver Medal.

Highest in general proficiency, second year, 1902-03,—J. E. Howitt, Guelph, Wellington, Ont.

Special Work in Departments.

I have been in the habit of reviewing briefly the work of each Department for the year, emphasizing the points of immediate practical importance, with a view to assist ordinary farmers in gleaning from our annual report, without too much reading, the facts and results which are of most value to them ; but having occupied considerable space with notes and observations on "Agricultural Education," I shall refrain from attempting any review of departmental work this year.

June Excursions to the College.

The number of excursionists, chiefly farmers and their families, who visited the College in the month of June last, was larger than usual. According to railroad reports, there were between 35,000 and 40,000,—the same people, or most of them the same, coming from year to year for an outing and to learn what they can from the many branches of agricultural work that are carried on at the farm.

Needs of the College.

The most urgent needs of the College at the present time are increased dormitory accommodation; an Insectary for practical work in entomology; a large building furnished with shafting, electric power, etc., for operating, comparing, and studying implements of different kinds during the winter months, when students have but little opportunity for practical work in the ordinary outside departments; and, last but not least, a new Bacteriological Laboratory, with a good isolation stable, for instruction and research in the boundless field which opens up before the investigator in this very important branch of scientific work,—closely connected, as it is, with soil fertility, dairying, stock raising, and every form of disease which afflicts man or beast. What a blessing it would be if the bacteriologists should succeed in finding, say, for hog cholera or for typhoid fever, such an antitoxin as they not long ago found for diphtheria. And, in conclusion, it may not be amiss to call attention to the fact that the State of Michigan, U.S.A., has recently provided for its Agricultural College, Lansing, a Bacteriological Laboratory at a cost of $55,000, raised by direct taxation on the property of the State,—$30,000 for the building and $25,000 for equipment.

Guelph, Dec. 31, 1903.

JAMES MILLS,
President.

PART II.

THE DEAN OF RESIDENCE.

To the President of the Ontario Agricultural College :

Sir,—I take much pleasure in presenting herewith a report of my first year's work as Dean of Residence and Instructor in English.

As Dean of Residence, it has been my duty to preside over the students' dining-room, to examine from time to time the college furniture, to supervise the care of the residence building and all needed repairs, to superintend evening study, and to direct the students as to conduct and duty.

My relations with the students and my work among them as Dean of Residence have been enjoyable. This has been due largely, I think, to the manly spirit displayed by all the students, and to the decidedly improved tone prevailing throughout the College. Considering the crowded condition of the dining-room, the conduct of the students has been very gratifying. Despite the fact that the room has been overcrowded, the order and decorum of the students have been good.

A marked respect is shown by the students for the rights of their fellow-students. Consequently almost all closely observe the regulations pertaining to study hour. The abundant physical energy of the students finds constant relief in outside work and in college athletics ; and to this fact, largely is attributable the order and quietness prevailing throughout the study hour. Moreover, as the term advances, closeness of application and systematic work become more and more characteristic of the study. Many who, on entering the college halls, found it almost impossible to concentrate their mental power for an hour at a time, have not only learned how to accomplish much in that time, but also can with ease apply themselves for a much longer period.

In the classroom, my energy has been devoted to the teaching of English Literature, English Grammar, English Composition, and Bookkeeping. In the teaching of English, it has been my aim not only to develop the ability of correct and artistic expression, but also the power of acute logical thinking, thereby attaining a good practical mastery of our mother tongue. In Grammar, besides seeking to give the students a knowledge of the correct forms of words with their inflections and governing laws, I have always considered their syntactical use. In Literature, the study has been directed with a view to broadening the student's field of thought, extending his vocabulary, enhancing his style of writing, and in developing in him a love for good literature by a study of a few standard authors. In Composition, my object has been to enable the student to think and to express his thoughts in a clear, precise, strong, and elegant manner. To this end, a study of the various structures of the sentence has been followed by a study of the arrangement and relation of sentences as combined in the paragraph, and the relation of the paragraph to the whole composition. I have sought to have the students write an essay every two weeks on such topics as the following : "The College Sale," "The Winter Fat Stock Show," "Agricultural Education," "The Macdonald Institute," and "The Grand Trunk Pacific." These essays I have examined and taken up in the class, pointing out their prominent defects. In the writing of these compositions, I have always demanded an outlining of the essay before the writing of it.

The course in Bookkeeping comprises business correspondence, commercial forms, and the keeping of a set of practical farm accounts.

In closing, I would remind you that the college residence is entirely inadquate for the accommodation of the number of students now in attendance.

I am, yours respectfully,

J. A. McLEAN,

Dean of Residence.

PART III.

THE PROFESSOR OF PHYSICS AND LECTURER IN ENGLISH.

To the President of the Ontario Agricultural College :

Sir,—I have the honor to submit herewith my ninth annual report in the Departments of Physics and English.

Instruction in English.

The work in this department has gone forward with good success. There being no one person whose sole duty is the teaching of English, it is subdivided, those who teach it having work in other departments also. The Dean of Residence teaches the English literature, grammar, and composition, of the First and Second Years. The Associate Professor of Agriculture has charge of instruction in public speaking, given principally to the Second Year. The Third and Fourth Year English is taught by myself. Much of this instruction is, therefore, given against the pressure of many duties, proceeding from scientific and practical departments. There is danger, with the increase of those duties from year to year, that the work in English may suffer from enforced neglect. To judge from the growth of the College in the last four years, I am of opinion that the time is close at hand when it will be advisable to place all the English under the charge of a professor who will be able to devote all his time to it, and give it all the attention its importance demands.

Meanwhile it is gratifying to note the continued interest that the students of all years display in the English studies, and to observe the very marked improvement in all directions,—in writing, in speaking, and in the interpretation of literary masterpieces. It is gratifying, also, to learn from the University examiner in English that the graduating class of last year excelled in the correctness and precision of their answers, and in the general character of their English papers. This improvement is due in part to the lengthening of the course, from the diploma to graduation, to two years, while the amount of English read in the two years does not exceed that formerly read in one year. A deeper and a more accurate knowledge of the authors and their periods is the result. We may conclude that the extent of English studies is now properly proportioned to the needs and requirements of the classes, and to the other branches of study.

Instruction and Investigation in Physics.

The Department of Physics is now situated in the new Biology-Physics Building, with ample quarters. The generosity of the Legislature in its annual appropriation has enabled this department to become fairly well equipped in apparatus. A number of appliances very useful in instruction and investigation are still wanting, but we hope to be able to secure these at an early date.

In February of this year, Mr. McCalla, B.S.A., Fellow in Physics, resigned, and Mr. H. S. Arkell, B.A., was temporarily appointed to the position, Mr. Arkell's purpose being to proceed with his B.S.A. course this autumn. In April, Mr. W. H. Day, then a senior student at Toronto University, and since graduated with Honors in Physics, was appointed Fellow in Physics. In August he was advanced to the position of Demonstrator. Mr. Day has proved to be a most capable teacher and demonstrator. His six years' experience in Public School teaching, and his thorough course in Physics at the University, enable him to perform with efficiency the duties of Demonstrator,—a work very important in the present methods of teaching science.

The work of instruction in Physics is now subdivided and classified as follows :

First Year.—Mechanics, being a laboratory course, supplemented by lectures, in the principles of machinery ; mechanics of water supply,—a study of appliances for conveying water, such as pumps, windmills, siphons, hydraulic rams, etc.; an elementary course in soil physics,—a study of the structure of soil, its physical properties, and the movement of air and water through it ; elementary physics,—to lay the foundation for the above work, and for that of the Second Year. This consists of a brief course in hydrostatics, the use of balances, weighing and measuring by the metric system, etc.,—all in the winter term.

Second Year.—In the winter term, a review and an extension of the above divisions; in the autumn, a course in Surveying and Levelling for drainage plans. In surveying, students learn by practice the various uses of the surveyor's chain, in measuring areas of different shapes. In levelling, a field is selected and by means of levelling instruments a report of the elevations and dpressions in the surface is obtained, from which a contour map is made, and then the courses of drains marked out, with tables showing directions, depths, and slopes.

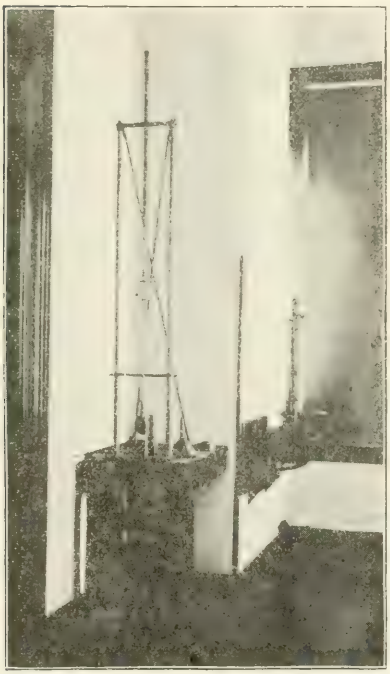


Fig. 1. Soil compacting machine for filling tubes with soil uniformly.

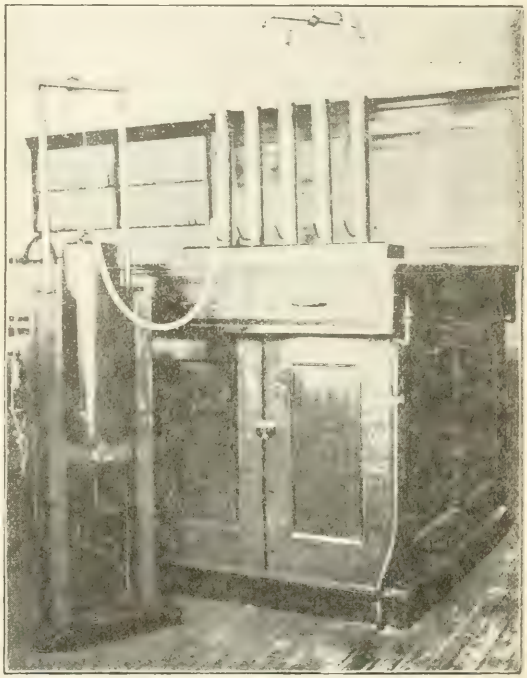


Fig. 2. Aspirator and tubes for examining the movement of air in soils.

Third Year.—Courses of lectures and practical work in Heat, Meteorology, and Cold Storage, covering the whole year.

Fourth Year.—Courses, covering the whole year, of lectures and laboratory investigation in Heat, Refrigeration, and the Physical Properties of the Soil ; Climatology, being principally a study of the Climate of Canada in relation to Agriculture, and involving a course of lectures, and the preparation by students of charts of rainfall and temperatures for different points in Canada.

REPORTS OF INVESTIGATIONS.

I. Lightning Report.

The losses by lightning stroke reported this year are fewer in number, and their amount much less, than in either of the two years preceding. A comparison of the three years gives the following result :

Analysis of Species of Trees Struck.

	Elm.	Pine.	Basswood.	Oak.	Maple.	Ash.	Hemlock.	Poplar.	Willow.	Beech.	Chestnut.	Balsam.	Apple.	Hickory.	Total.
1901	7	8	5	1	2	....	2	....	....	....	1	....	....	....	26
1902	6	1	2	5	4	2	....	1	1	1	....	1	....	1	25
1903	5	3	....	1	....	1	....	1	1	....	....	....	1	....	13
Total	18	12	7	7	6	3	2	2	2	1	1	1	1	1	64

Analysis of Species of Animals Struck.

	Cattle.	Sheep.	Horses.	Hogs.	Total.
1901	33	7	11	1	52
1902	22	47	17	3	89
1903	8	1	2	.....	11
Total	63	55	30	4	152

Analysis of Buildings Struck.

	Barns.	Other buildings.
1901	26	6
1902	39	19
1903	24	8
Total	89	33

Barns Struck.

Situation.	Date.	County	Locality.	Nature and extent of damage.	Loss.
Four rods from row of fruit trees	Apr. 2	Kent	Harwich	Partly burned	$425
Not specified	May 26	Waterloo	.....	Destroyed with contents	Not estimtd
" "	" 28	Oxford	.....	"	"
Trees 10 rods away	June 21	Wellington	Minto	Burned	$1,835
8 ft. from rodded barn	July 11	Wentworth	Glanford	Very slightly damaged	
Near other buildings	" 14	Lanark	Drummond	Burned	2,000
Isolated	" 20	York	Markham	Slightly damaged	15
"	" 21	Hastings	Hungerford	"	15
"	" 29	Kent	Harwich	Burned	750
A few small trees near	" 29	Peterboro	Asphodel	"	1,700
Isolated	Aug. 6	Carleton	March	"	2,150
Near poplar trees	" 6	Wentworth	Glanford	Slightly damaged	5
Near other buildings	" 11	"	"	"	
Barn was rodded	" 24	Wellington	Puslinch	Windmill on barn damaged	
Some trees near	" 24	Simcoe	Avening	Burned with crop	1,500
Not specified	Sept. 4	.....	Oxford Mills	Burned, with outbldngs, & crop	Not estimtd
" "	" 4	Ontario	Brougham	" "	"
" "	" 4	.....	Winchester	" season's crop	"
" "	" 4	Wellington	Puslinch	" "	"
Fruit trees near	" 4	Durham	Clark	" "	1,000
Isolated	" 4	Simcoe	Tecumseh	" "	1,600
Not specified	" 5	Elgin	Talbotville	" "	2,000
" "	" 5	Middlesex	...	" "	Not estimtd
" "	" 4	Wellington	Flamboro	" "	"

Live Stock Killed.

Circumstances.	Date.	County.	Horses.	Cattle.	Sheep.	Value.
						$
Near a rail fence	May 26	Dufferin		1		40 00
In open field	July 10	Lambton		1		40 00
"	" 29	Perth		2		195 00
Under elm tree	" 29	Wentworth		2		70 00
In a stable which was struck	" 29	Peterboro	1			100 00
Under a tree	Aug. 17	"		2		70 00
	Sept. 4	Dundas	1			100 00
Near building, in field	" 9	Grey			1	5 00
Total			2	8	1	620 00

Trees Struck.

Situation.	Nature and extent of damage.	Date.	County.	Elm.	Pine.	Black ash.	Oak.	Poplar.	Willow.	Apple tree.
Single	Barked	May 18..	York	1	...	....	....	....	....	....
"	Top torn off	" 18..	"	....	1	....	....	....	....	....
"	Limb splintered	" 26..	Wentworth.	....	1	....	....	....	....	....
Low, wide-spreading	Destroyed	" 26..	Lambton	....	....	....	....	....	1	....
Corner of orchard	Scorched	" 27..	Grey	....	....	....	....	....	....	1
....	Destroyed	June 18..	Brant	....	....	....	1	....	....	....
1½ feet apart	Barked	July 14..	Lanark	2	....	....	....	....	....	....
High tree, in a row	....	" 20..	Simcoe	1	....	....	....	....	....	....
" "	....	" 20..	"	....	1	....	....	....	....	....
Single	Slivered and barked.	Aug. 1.	"	1	....	....	....	....	....	....
High tree, at edge of bush.	Split	" 8..	Prescott	....	....	1	....	....	....	....
In front of house	Destroyed	Sept. 5..	Elgin	....	....	....	....	1	....	....
Total				5	3	1	1	1	1	1

The remarkable features of these reports are, as in the previous years, the great number of barns struck and destroyed with the season's crop, and the comparative infrequency of serious loss with barns or other buildings when the buildings are rodded or adequately protected by trees. The two instances in which rods are mentioned are (1) that of a windmill on a rodded barn being struck, the windmill only being damaged; (2) that of a hay barn, separated by a space of 8 feet from another barn that was rodded. The hay barn was slightly damaged. As to trees, the writer is impelled by the evidence to repeat and to emphasize what was formerly said in the same connection, namely, that trees, and plenty of them, such trees as spruce, elm, or maple, planted near the farmstead, are a permanent and an increasing means of protection from lightning. They should be planted so that their branches, when full grown, will not touch the buildings, and yet not so far away that their protective influence is diminished. The measure of protection afforded by trees does not lie in the fact that trees are more liable to be struck than buildings, and that in the event of a storm they may be struck and the neighboring buildings saved. Such a circumstance may occur, and, in fact, often does; but a group of trees may save an adjacent building from destruction without being injured themselves. The fact is, the group, trees and buildings, are mutually protective, and very probably draw off in harmlessly small quantities the electric charge which, over the bare ground or over a single tree or building, accumulates and finally discharges with destructive violence.

II. Climatic Limits.

It is an interesting fact that at some latitude in Ontario is found the northerly limit for each of several of our most valuable agricultural and horticultural products,—such as peaches, grapes, corn, and apples. In order to find out, if possible, the position of some of these limits, this year a circular of inquiry was sent out by the Department of

Physics to a number of farmers and fruit-growers in the Province, from Essex County to the Rainy River District. About fifty replies were received, and from these replies some general conclusions have been reached upon the matter in question. In stating these results, I should like to point out some of the climatic conditions that go to determine the limits under consideration.

The Province of Ontario extends from south to north over 10 degrees of latitude,—from 42 degrees at the southern border of Essex County, to 52 degrees at the mouth of Albany River, a distance of nearly 700 miles. Within these latitudes are found wide differences of climate. Apart from the fertility and the physical condition of the soil, the elements that affect the growing and maturing of crops are climatic. The principal of these is summarized in the following table :

Stations.	Temperatures.						Months without frost. 100=complete freedom from frost.						Mean Precipitation. Rain and melted snow.	
	Latitude.	Mean Annual Lowest.	Mean Monthly Lowest.	Daily Range for March.	Mean for May.	Mean April to Sept.	May.	June.	July.	August.	Sept.	Oct.	April to Sept.	Oct. to March.
	° ′	°F	°	°	°	°							"	"
Pelee Island	41.50	— 5	19.7	9.4	57.2	63.7	80	100	100	100	100	80	17.24	14.68
London	42.59	—19	13.0	17.7	56.3	61.0	23	100	100	100	61	00	17.91	21.15
Toronto	43.40	—15	14.9	14.2	52.1	58.0	61	100	100	100	92	00	15.26	15.82
Owen Sound	44.34	—22	11.5	18.1	51.6	57.0	17	92	100	100	42	00	17.54	22.41
Gravenhurst	44.54	—33	5.1	21.7	52.7	57.4	8	92	100	100	33	00	17.21	18.37
Ottawa	46.26	—27	1.1	18.1	55.1	59.0	50	100	100	100	33	00	16.23	16.11
Haileybury	47.29	—34	—47	24.9	51.2	56.0	00	83	100	83	00	00	18.12	14.15

The suitability of any locality for growing a particular kind of produce is due not to one of these causes only, but generally to a combination of them. The meaning and extent of influence of these climatic elements will be considered under three heads: 1. Lowest temperatures. It is evident that if the winter temperature is likely to go below a certain minimum, if only once in the winter, that temperature may be destructive of trees, vines, or shrubs of the tender sort. Or if the average lowest temperature for any of the winter months is sufficiently low, then from long-continued low temperatures the trees, etc., may be killed. These two factors are expressed in columns 2 and 3 of the table :

Report on Winter-Killing.

Station.	Latitude.	Kind of fruit or grain.	Remark.
	° ′		
Smithville	43.06	Blackberries	Winter kill.
Coldstream	43.	Peaches, blackberries	Winter kill.
Mitchell	43.27	Peaches	Subject to winter-kill.
Oshawa	43.51	Winter wheat	Subject to winter-kill.
Newmarket	44.02	Strawberries	Subject to winter-kill.
Cornwall	45.02	Pears	Very few grown. Winter rather severe.
Rosetta	45.07	Plums and pears	Winter too severe.
		Winter wheat	Winter killing.
Utterson	45.10	Cherries	Trees all die first winter.
Parry Sound	45.20	Peaches	Grow three years, kill back every winter to snow-line, and finally die.
		Grapes	Have to be sheltered.
		Winter wheat	Too much snow.
Magnetawan	45.40	Red raspberries	Canes killed with frost.
		Sour cherries	Some live for few years.
Dryden	49.47	Berries, plums, cherries	Winter too severe.
		Apples	Only crabs have stood the winter.
Utterson		Apples	The hardiest varieties do well.
Orangeville	43.55	Peaches	Too severe winter.

Next to winter-killing from low temperatures, the influence of spring frosts may be considered. The damage done by a spring frost is of two sorts : (1) that known as sun-scald, (2) the killing of fruit buds and fruit sets. Sun-scald is supposed to be the result of extremes of temperature between day and night during early spring, the warmth of the sun in March being followed by a severe night frost. The liability to sun-scald, then, is expressed by the daily range of temperature at the season when such injury occurs. It may be seen from column 4 in the table that the more northerly points have a greater range of difference between day and night temperatures, and consequently fruit trees and bushes grown in the north are more liable to this form of injury. The second form of injury,—the killing of fruit buds by late frosts, depends upon the amount of advance made by the trees or plants at the time of the frost, and this in turn depends upon the mean temperature of the spring months, especially of May, when the buds begin to form and the fruit to set. A high mean temperature for May, with a liability to occasional frosts, is a very unfavorable condition for fruit. Just in this particular lies the great importance of nearness to a large body of water. The tempering influence of the water, which heats more slowly than the land, retards the advance of spring upon the land near it. A large fruit-grower at Newcastle, Ontario, whose pear orchard is within a mile or two of Lake Ontario, informed the writer last summer that five miles north of his orchard, and that distance farther from the lake, spring opened and seeding commenced a week or ten days earlier than at his farm. To this fact, the influence of the lake in retarding spring development, he attributed his unfailing success in obtaining a crop of fruit. In column 5, under Temperature, Pelee Island shows a high figure; but this point, on account of its southerly position, is safe from May or June frosts. London, Ottawa, and Gravenhurst are much less favorably situated in this particular than Toronto and Owen Sound. The exceptional success that attends fruit-growers in the Georgian Bay and Lake Ontario districts is due in large part to the slower march of spring temperatures, and hence to greater immunity from damage by spring frosts.

The shore line of Southern Ontario and the borders of the western peninsula are especially favored by the tempering influence of the great chain of lakes and rivers, from Georgian Bay to River St. Lawrence. The width of the strip along the water coming within its influence depends upon the local topography. The high ridge of land running along near the shore from Hamilton southeastward is an important factor in fixing the line between safety and danger from frosts and extremes of temperature in spring.

Spring Frosts.

Station.	Latitude.	Kind of fruit.	Remark.
Seaforth	43.32	Grapes	Late spring frosts.
Oshawa	43.51	Peaches	Late frosts ; trees grow well here, occasionally bear well.
Newmarket	44.02	Peaches	Spring frosts.
Gravenhurst	44.54	Cherries	Buds suffer from frost.
		Apples	Sun scald.
Magnetawan	45.40	Quinces	Have been tried ; frost kills every spring.
		Apples	Worst trouble appears to be sun scald.
Powassan	46.05	Cherries	Frost killed fruit sets.

The third important climatic factor is the length of the season. The factor depends upon two conditions : (1) the number of months without frost, or, more properly, the average dates of occurrence of the last spring frost and the first autumn frost ; (2) the mean temperature for the growing season. Grain, vegetables, or fruit may fail to mature from either of these two reasons, namely, shortness or coolness of the growing season.

Short Season.

Station.	Latitude.	Produce.	Remarks.
Smithville.....	43.06	Peaches.....	Season not favorable.
Seaforth.....	43.32	Tomatoes.....	Early frosts.
		Melons	Summer too cool.
Georgetown	43.39	Peaches	Fruit will not ripen.
		Grapes	" " "
Palmerston.....	43.50	Tomatoes.....	Season not long enough.
		Peaches	Have one peach tree ; fruit never ripens.
		Grapes	Do not mature.
Oshawa	43.51	Corn (grain).....	Sometimes fails to ripen.
Caledon...	43.52	Tomatoes.....	Short season.
		Corn (grain).....	Only the very early varieties mature here.
		Grapes	Not good success. Short season.
Orangeville.....	43.55	Grapes	Season too short.
		Pears	" "
Newmarket	44.02	Corn (silage).....	Failure from frosts.
		Corn (grain).....	Will not mature before frosts set in.
		Peaches.....	Season too short.
		Grapes.....	Early fall frosts.
Orillia.....	44.33	Peaches.....	Saw a few very fine ones last year grown on a local seedling, which is still alive.
Perth.....	44.53	Pears	Do not ripen early enough.
Cornwall.....	45.02	Corn.....	All flint varieties ripen here.
Utterson	45.10	Corn.....	A little grown for green feed ; season too short to ripen.
		Grapes.....	Vines do well, but they seldom ripen.
Parry Sound....	45.20	Melons	Season too short.
		Grapes	" "
Magnetawan....	45.40	Corn (silage).....	Will grow fairly well and reach glazed stage.
		Corn (grain).....	Have seen some well-ripened grain.
		Grapes	Vines live well, but fruit does not ripen.
Powassan.....	46.05	Niagara and Brighton grapes..	Ripen fairly well.
		Melons	Grown by some that say they have ripened them.
Dryden.....	49.47	Sugar Beets.....	Season too short.

SUMMARY OF THE REPORTS.

Peaches. The northerly limit for peaches is about the 43rd parallel, running through Sarnia, London, and Welland. While the whole of the Niagara, Grimsby, and Winona districts is fifteen or twenty miles north of this line, these districts are favorably situated on the southern shore of Lake Ontario. Here and there north of the 43rd are certain favored spots where peaches may be grown successfully. Wherever locally, by natural or artificial means, the season is lengthened or made warmer, there the peach may be grown; but such spots are not frequent or of very large area. From many points seedlings are reported as bearing and maturing fruit, and the development by this means of a hardy variety suited to a particular locality may well deserve the attention of local horticultural societies. Guelph City and vicinity reported for the year 1902 thirty seedlings bearing, of which ten were of good quality. Clarksburg on the Georgian Bay reports that the hardier varieties are grown with good success.

Grapes. Much the same may be said of grapes as of peaches. Their home is south of the 43rd parallel. Of both these fruits, it may be said that between the 43rd and the 44th parallels, the trees and vines generally do well; but the season is on the whole too short. North of the 44th parallel the winters are rather severe, while beyond the 45th it is seldom that trees or vines survive.

In this connection the temperatures for Ottawa district are noteworthy. Although 120 miles north of Toronto, Ottawa shows a mean temperature for April to September of 59 degrees—one degree higher than that at Toronto. If the vines can be sufficiently protected during the winter and early spring, Ottawa should be able to grow grapes with considerable success.

Pears and Cherries (Sour) do well beyond the 44th parallel. Toward the 45th parallel spring frosts are frequently destructive, while beyond the 45th the trees suffer greatly from winter-killing.

Tomatoes. North of 43½ degrees tomatoes frequently suffer from early frosts.

Apples. The farther north apples can be grown the better seems to be their quality. North of the 45th parallel, however, care should be exercised in slecting varieties that will stand the winters. Winter-killing and sun-scald seem to be principal causes of injury to apple trees in the higher latitudes of the Province.

Corn is a southern plant, belonging south of the 43rd parallel, and most of the seed is grown south of this line. Some early varieties are matured as far north as the 44th. One locality (Cornwall) at the 45th reports that flint varieties will mature, but this is at the waterfront and is evidently exceptional. Corn for silage can be grown with some success, but with considerable risk of early frosts, as far north as the 45th. With this crop much depends on the soil upon which it grows. A loam or sandy loam by its warmth and excellent texture hastens the growth and maturity of the corn. Given a reasonable amount of moisture in the soil, the corn plant thrives better with plenty of heat, which should be sought in a mellow soil.

In general, it appears from the reports received that there is much misdirected and unprofitable effort made in attempting to propagate varieties unsuitable to the climates of the respective localities. The desirability of having choice fruit of various sorts in one's own garden or orchard is without question, and the attempt should be encouraged. Yet it is the part of wisdom to recognize climatic limits, and to select with care and intelligence those varieties or species that are suited to the exigencies of the local climate.

This report does not profess to be final, but is rather in some degree tentative. It is the beginning of an attempt to secure definite and exact knowledge regarding the climate of our Province and its influence upon agriculture. Not the least of our natural resources is our climate, which by its variations no less than by its general character makes possible a wide variety of produce, excelling both in quantity and quality. It is the hope of the writer that this initial report will provoke inquiry, possibly contradiction of some of its statements, with the result that the information desired will be speedily forthcoming.

III. Temperature in Relation to Seed Germination.

This investigation was carried on by means of a seed germinator, consisting of an interior oven surrounded on all sides by double walls, within which water is kept. Heat applied to the base of the apparatus maintains the oven at any desired temperature, the circulation of the water distributing the heat evenly within the surrounding walls. In the oven, the seed is germinated between two concave plates laid face to face. On the lower plate a square of saturated blotting paper carries the seeds to be tested, another square of damp paper is laid over the seeds, and another plate laid face down over the whole. Fifty or one hundred seeds of one kind, according to their size and to the space available, are placed on each plate.

Per Cent. of Seed Germinated at Different Periods After Seeding.

Wheat.

No. of days after seeding.	55°–65°	68°—72°	80°	90°	95°
1					
2		6	28	8	
3	36	54	74	32	
4	82	84	82	48	
6	86	94	82	Mildew	
8	90	94	Mildew		

Corn (dent).

1					
2			6	10	28
3	6	18	66		76
4	18	70	82	82	Mildew
6	64	72	92	82	
8	74	82	92	82	

Turnip (Swede).

1			84	84	66
2	82	94	94	96	86
3	94	97	98	98	92
4	94	98	100	100	92
5	96	98			92
8	98				92

Days required for the first appearance of radicle at various temperatures.

—	45°—55°	55°—65°	68°—72°	80°	90°
Wheat		3	2	2	2
Oats		3	2	2	2
Barley		2		1	1
Pease, smooth	7	5		4	4
Pease, wrinkled	11		5	4	
Corn (dent)		3	3	2	
Turnip		2	1	1	1
Carrot	9	4	3	2	
Beet	9	5	2	2	
Parsnip		7	5	5	5
Bean	19	4	3	3	2
Clover		1		1	1
Onion	14	3		2	

Temperatures of Germination.

Species.	Best.	Second.	Third.	Remarks.
Cabbage	80	68-72	90	Vitality impaired above 80°, below 68°.
Onion	80	90		
Parsnip	80	90		Vitality destroyed at 95°.
Cauliflower	80	68-72	55-65	Vitality impaired beyond 80°.
Oats	80	68-72	55-65	Vitality impaired beyond 80°.
Beans	90	80	68-72	Mildewed at 95°.
Pease (smooth)	80	68-72	55-65	Vitality almost destroyed at 90°.
Pease (wrinkled)	68-72			
Wheat	68-72	55-65	80	Vitality impaired at 80°.
Barley	80	90	68-72	
Corn (dent)	80	90	68-72	Some mildew at 80°.
Pease (sweet)	68-72	55-65	80	Earlier germination, but impaired vitality at 80°.
Carrot	80	90	68-72	Vitality impaired beyond 90°.
Turnip (Swede)	80-90	68-72		Vitality impaired beyond 90°.
Turnip (white)	90	80	68-72	Vitality impaired beyond 90°.
Rape	90	80		
Beet (common)	80	90	68-72	
Beet (sugar)	80			
Clover (red)	90	80	68-72	Vitality impaired at 95°.
Clover (alsike)	80	68-72	90	
Radish	80	68-72		Mildewed at 90°.
Cucumber	90	80	68-72	Vitality impaired at 95°.
Tomato	90	80	68-72	Vitality impaired at 95°.
Squash	80	90		

The results of the investigations in seed germination are presented above in three forms. The first table gives the results of the count for three seeds—wheat, corn and turnips. The second shows the effect of temperature on rate of germination. The third gives a summary of the results, showing the best temperature, the second and third best, with regard to rate of germination and vitality of seed; the last column in this table showing the effect of higher and lower temperatures in imparing the vitality of seeds

Referring now to the chart below—Mean Soil Temperatures, 1903—we find that in the first week in May the soil and air temperatures coincided at 53 degrees, the soil temperature being that observed at one foot deep. It is probable that the soil temperatures three inches and six inches deep would be but slightly higher than that at one foot deep, but only slightly. It appears, therefore, that at this period, when most of our spring grain has been sown or is being sown, the soil temperature barely reaches the best temperature for any seeds, and for most seeds is much below the best. For the last week in May the soil temperature at a depth of one foot was 57 degrees, which is over 20 degrees lower than the best temperature for corn. By June 15th the soil temperature at the same depth had reached the temperature of 58.5 degrees, which is also more than 20 degrees lower than the best for the germination of turnip seed.

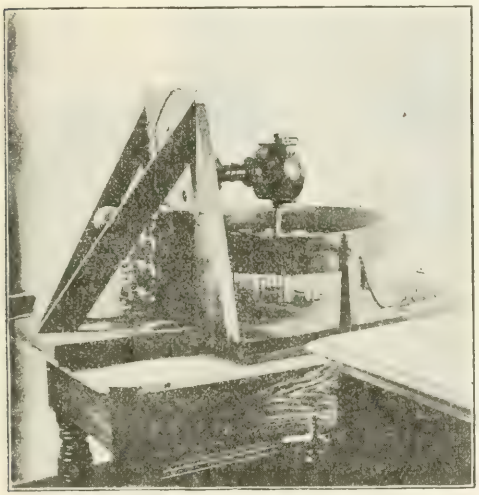


Fig. 3. Motor and centrifuge for physical analysis of soils.

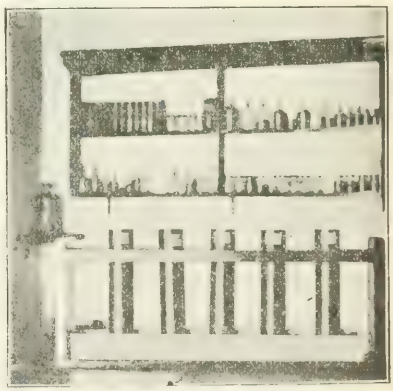


Fig. 4. Capillary tubes, for investigating the capillary capacity of soils.

These results afford fresh proof, if further proof is needed, concerning the necessity for a careful and intelligent cultivation of the soil. Heat and moisture in the soil are the prime requisites for the best success in crop growing. How to secure the right degree of each of these conditions without sacrificing the other is the great problem in cultivation. Heat is readily secured, provided the soil is dry. An excess of moisture means a loss of heat. Both conditions, however, may be secured best (1) by underdrainage, sufficient to draw off the surplus moisture, which otherwise must be removed by heat that should be used in warming the soil; (2) by proper fall cultivation, leaving the land ridged or uneven to hasten surface drying in the spring; (3) by early spring cultivation to separate a seed-bed from the wet subsoil, so that this seed-bed may become partially dried and warmed; (4) by increasing the vegetable matter in the soil, which by its dark color absorbs the sun's heat.

This department will next season conduct a series of observations on soil temperatures in actual field conditions at seeding time and during the germination of the seed.

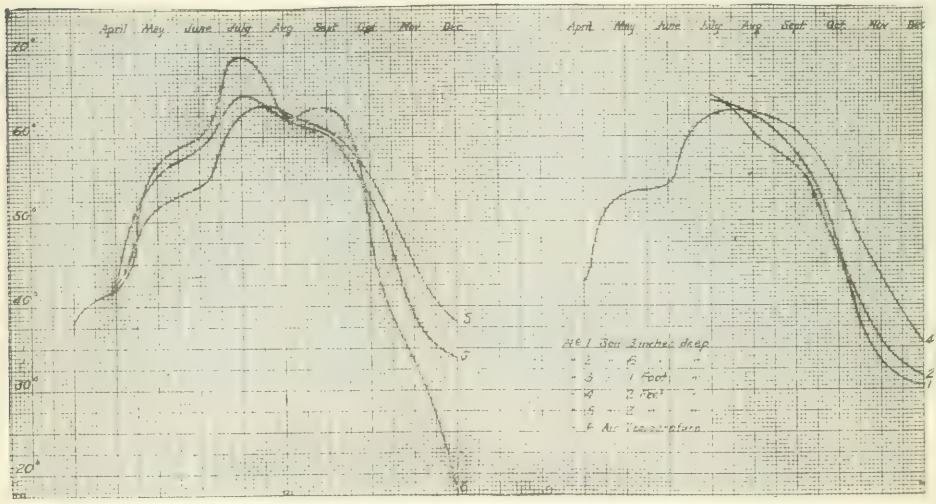
IV. Soil Temperatures at Various Depths.

These temperatures were obtained from thermometers standing in the grounds at depths of 1 foot, 2 feet, 3 feet, respectively, from April 1st until December 31st. In July two other thermometers were added at depths of 3 inches and 6 inches. It is the intention to continue these observations henceforth throughout the whole year.

The report is presented in two forms, the table and the chart :

Mean Soil Temperatures, 1903.

Month.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
April	.....	.....	41.9	43 0	42.7
May	.....	.....	55.5	53.4	51.9
June	.....	.....	58.6	54.3	54.2
July	64.7	64.3	64.9	62.5	62.6
August	60.3	61.1	62.1	62 9	63.0
September	56.4	58.1	60.5	60.9	61.1
October	46.4	46.8	53.4	54 0	55.3
November	33.4	35.8	39.0	43.6	45.3
December	30.5	31.7	33.9	35 9	38 2
	3"	6"	1'	2'	3'



Mean Soil Temperatures, 1903.

Mean daily variability of soil and air temperatures. The change of temperature from day to day, increase or decrease, known as the variability of temperature, is indicated for different depths in the ground and for the air by the following figures :

	Mean daily variability.
Air temperature	5.1° F.
Soil temperature, 3 inches below surface	3.5
Soil temperature, 6 inches below surface	2.9
Soil temperature, 1 foot below surface	1.2
Soil temperature, 2 feet below surface	0.5
Soil temperature, 3 feet below surface	0.3

V. Freezing Points of Fruit Juices.

When the experiments in cold storage were being arranged, and the temperatures of the experimental rooms decided upon, the question arose: "At what minimum temperature may the cold storage rooms be kept without freezing the fruit?" To answer the question it was necessary to determine the freezing points of the various fruits. As no accurate feasible method of doing this with the whole fruits seemed to offer itself, it was decided to use the fruit juices for the purpose. The freeing points of the fruits themselves will, if anything, be lower than those of the juices, as the tendency of solid matter in liquids is to lower the freezing point. Hence the temperature at which the juices freeze will indicate a safe minimum for the temperature of the room.

Fig. 5. Tubes for investigating the percolation of water in soils.

The method of determining was as follows: A test tube about six inches long and one-half inch in diameter was placed erect in a larger vessel and was packed about with salt and ice, approximately in the proportion of one part of salt to two of ice by weight. This produced a very active freezing mixture. A small quantity of the juice was then poured into the test tube, a thermometer was inserted, the juice constantly stirred, and the temperature watched, the tube being lifted out of the freezing mixture from time to time for this purpose and the thermometer read through the tube. The temperature continued to fall until flakes of ice had formed throughout the juice, when a stationary point was reached. At this point the temperature remained until nearly all the juice was frozen, when it again began to fall. This stationary temperature was taken as the freezing point. As a check upon the work the stationary point was watched for as the juice melted. It was found to correspond very closely with that observed during freezing.

Experiments were conducted with various varieties of apples, plums, peaches, pears, grapes and quinces. The results are given in Table 1 below. It will be seen that grapes will stand more frost than any other class of fruit tested, that pears and quinces stand next, apples third and peaches and plums fourth. It will also be observed that the freezing point of all, except Crawford peaches, is below 30 degrees Farenheit. Hence, this is a safe minimum temperature for cold storage. The results also seem to indicate that the freezing point lowers as the fruit becomes riper, but direct experiments on this point are necessary before final conclusions are reached. If this is substantiated, then, it will be possible to reduce the temperature the longer the fruit is in storage with the result of lengthening the period during which the fruit may be stored.

The specific gravities of the juices were also determined. As we should expect, the freezing point varies inversely with the specific gravity—the higher the specific gravity, the lower the freezing point.

The Freezing Points of Fruits.

Fruit.	When stored.	When tested.	Condition.		Specific gravity.	Freezing pt.	
			When stored.	When tested.		Cent.	F.
Apples.							
Astrachan	Aug. 18	Sept. 9	Rather green	Very ripe		—1.7	28.88
Snows, O.A.C	Sept. 28	Nov. 18	Firm	Firm	1.0527	—1.5	29.30
Snows, Guelph	Oct. 21	Nov. 18	Ripe	Very ripe	1.0570	—1.55	29.21
Snows, Maitland	Oct. 28	Nov. 18	Ripe	Ripe	1.0520	—1.5	29.30
Spy, O.A.C		Nov. 19	Firm, under colored	Ripe	1.0526	—1.4	29.48
Spy, Guelph	Oct. 21	Nov. 19	Firm, well colored.	Ripe	1.0534	—1.5	29.30
Average							29.3
Plums.							
Washingtons	Aug. 25	Sept. 11	Fairly ripe	Very ripe		—1.3	29.66
Bradshaws	Aug. 25	Sept. 11	Rather green	Fairly ripe		—1.2	29.84
Shipper's Pride	Aug. 25	Sept. 11	Fairly ripe	Ripe		—1.25	29.93
Average							29.8
Peaches.							
Steven's Rareripe	Sept. 23	Nov. 23	Firm	Ripe, prime	1.062	—1.5	29.3
Crawfords	Sept. 23	Nov. 23	Ripe	Ripe, prime	1.052	—1.3	29.66
Crawfords	Sept. 23	Nov. 23	Firm	Fairly ripe, fair quality	1.047	—1.1	30.02
Average							29.66
Grapes.							
Delaware	Sept. 24	Nov. 23	Ripe	Ripe, prime	1.0705	—2.3	27.86
Catawba	Oct. 30	Nov. 23	Ripe	Prime	1.0875	—3.0	26.6
Niagara	Oct. 30	Nov. 23	Ripe	Prime	1.048	—1.6	29.12
Average							27.86
Pears.							
Bartlett	Sept. 23	Nov. 23	Firm	Hard, brittle, no flavor	1.0525	—1.6	29.12
Flemish Beauty	Aug. 13	Nov. 23	Firm	Green	1.0510	—1.6	29.12
Louise Bon	Sept. 5	Nov. 23	Firm	Ripe, prime	1.0605	—2.0	28.40
Average							28.88
Quince.							
	Sept. 23	Dec. 3	Fairly ripe	Fairly ripe	1.0500	—1.6	29.12

VI. The Cold Storage Building and Experiments.

The new cold storage building described in the annual report for 1902 has enabled us this season to conduct more extensive experiments, under more controllable conditions, than in previous years. Half of the experimental section of the building is reserved for storing dairy produce, the experiments in this section being under the charge of Professor Dean. The other half is devoted to fruit storage, and these experiments are in charge of Professor Hutt and myself. The experiments this year

began with strawberries, and included raspberries, currants, early and late apples, plums, pears, grapes, peaches and quinces. It is not the intention here to give in detail any of the results obtained, since some of the fruit is still in storage. A report will likely be issued in separate form after all the species have been put out of storage.

Securing Proper Temperatures in Cold Storage Rooms.

The method of cooling the storage rooms was explained in the annual report for 1902. Briefly it consists in drawing the warm air from the rooms by a fan, driving it over pipes made very cold by expanding ammonia, and then back into the rooms. The air leaves the room by openings in a flue leading to the fan, and re-enters it by openings in another flue leading from the fan. The size of these openings is regulated by slides, and hence the rate of circulation may be increased or diminished, and the temperatures of the rooms correspodingly lowered or raised.

For our experimental purposes it was necessary to maintain one room at 30 or 31 degrees and another at 36 to 38 degrees, a difference of 6 or 7 degrees. Of the two rooms available one was exposed on two sides, the other on one only ; the latter was accordingly chosen as the more suitable for the lower temperature during the summer, when the outside air was much warmer than that in either of the rooms. But as the autumn drew on and the temperature at night fell to that required in the rooms, the days still being warm, and later when the days dropped to that temperature or below it, the nights being colder still, the summer conditions were reversed and considerable difficulty was experienced, not only in securing an even temperature, but particularly in maintaining the required difference of six or seven degrees. The difference in exposure of the two rooms was not at first looked upon as the determining factor in the problem, and efforts were made to secure the proper temperatures by running the plant during the day only or part of it ; but the results were not satisfactory. Consequently it was decided to test the effect of changing the rooms. The one formerly kept at 31 degress was now to be kept at 38 degrees, and vice versa. The fruits in the rooms were interchanged. The room now to be kept at 31 degrees is exposed on two sides, the one at 38 degrees on only one side. This proved effective, as there is a natural difference of several degrees between the temperatures of the two rooms. The plant has not been run since the change. The fluctuations of temperature were found to have been largely due to the effort to maintain at the higher temperature the room which would naturally be several degrees the colder. If, however, any slight fluctuations do occur they are easily remedied. If cooling is needed, the door leading from outside to the cooling room upstairs, where the fan is located, is left open, the cold air enters the cooling room and thence passes through the flues, into the fruit rooms below. If heat is needed, the doors into the hallway are left open, and the incandescent lights (two in each room) are turned on. The hall being situated in the centre of the building, and hence being unexposed, is about two degrees warmer than the cold room, while the lamps will raise the temperature about two degrees. While for three days in succession the outside air was below zero, the thermometer registered -17.5 on the 1st, -25 degrees on the 2nd, and -24 degrees on the 3rd, the temperature in the colder room did not fall below 29 degrees, which from Table 1 is seen to be just on the danger line. None of the fruit, however, was frozen at this temperature. This severe test demonstrated two facts : first, that the insulation is well-night perfect, and, second, that we are able, despite the greatest extremes of cold, to maintain throughout the winter almost uniform temperatures of 30 or 31 degrees, and 36 to 38 degrees in the two rooms respectively with practically no artificial heating.

VII. Weather Report, 1903. At O. A. C., Guelph.

—	Jan.	Feb.	Mar.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Mean temperatures.....	18.7	21.0	38.2	42.2	56.6	60.1	69.5	62.5	63.1	48.6	34.5	18.1	44.4
Dep'ture from normal	-0.6	+3.8	+9.5	-1.0	+2.0	-2.2	-0.1	-3.9	+2.4	-0.5	-0.9	-4.0	+0.7
Lowest temperatures...	-6.0	-8.5	10.8	8.7	25.0	43.0	43.0	41.0	29.0	24.0	-2.0	-9.0	-9.0
Highest temperatures...	46.0	45.0	73.0	77.0	84.0	82.0	90 0	81.0	83.0	74.0	66.0	42.0	90.0
Precipitation in inches (rain and melt'd snow)	2.03	0.72	0.22	2.69	2.44	3.05	2.67	3.47	1.48	2.78	0.75	1.25	23.53
Dep'ture from normal.....	+0.38	-0.85	-1.05	+0.75	+0.14	+0.30	-0.90	+1.44	-1.01	-0.49	-0.88	-0.25	-2.42

Weather Report.

Year.	Date of last frost in spring.	Date of first frost in autumn.	Length of period without frost.
1899.....	May 15	September 23	130 days.
1900.....	May 10	October 17.....	158 days.
1901.....	May 15	October 4	141 days.
1902	May 11	October 2	143 days.
1903.....	May 5	September 29	146 days.
Average	May 11	October 3	144 days.

Respectfully submitted,

J. B. REYNOLDS,

Professor of Physics.

PART IV.

THE PROFESSOR OF BIOLOGY AND GEOLOGY.

To the President of the Ontario Agricultural College :

Sir,—I have the honor of presenting herewith my Sixth Annual Report on the work done in the Biological Department for 1903.

The duties of this department fall naturally under three heads : 1, Instruction ; 2, Outside work, including correspondence and the writing of special articles for the press ; and, 3, Investigations regarding weeds, fungous diseases, and insects.

I. Instruction.

The work of instruction, of necessity, occupied the larger portion of the time of the staff of this department. With the increased accommodation furnished by the new class rooms and laboratories, more attention was given this year to the practical aspects of Biology, especially in their relation to Horticulture and Agriculture. By means of excursions the students became familiar with the habits and appearance of the weeds, fungi, and insects which do so much damage to farm, orchard, and garden crops; and by a laboratory study of their own and the department collections, they learned more intimately the structure and life-history of the plants and insects which were brought to their attentions, and much to accurate drawings of the objects studied. Moreover, the students were encouraged to continue their observations during the summer, at their homes on the farm, and were asked to report to this department the insect-pests and fungous diseases which were working injuriously on the crops. By these means we hope to have the young men leaving college not only good farmers, but also keen observers and accurate reporters of the farm conditions in their respective districts.

Following is a brief synopsis of the regular courses given in 1903 in Botany, Entomology, Zoology, and Geology :

Botany, First Year. (a) Field excurisons, where the student familiarizes himself with the names of the common wild plants, learns their manner of growth, and the ways the fruit and seeds are produced and disseminated ; (b) Laboratory studies of the entire plant, including root, stem, leaves, and fruit ; and (c) Lectures summarizing and illustrating the practical work.—By Mr. Hotson.

Botany, Second Year. (a) Field excursions and laboratory studies in the morphology of plants, especially those parts of economic importance, and their classification ; a critical study of weed-seeds, and an elementary course in the study of grasses and fungi ; (b) Lectures (two every week) on the morphology, classification, and physiology of plants.—By Mr. Lochhead and Mr. Jarvis.

Botany, Third Year. (a) Laboratory and lecture courses in systematic botany, including grasses—by Mr. Lochhead and Mr. Jarvis ; (b) Laboratory and lecture courses in Structural Botany—by Mr. Hotson ; (c) Lecture and laboratory courses in plant physiology—by Mr. Lochhead and Mr. Jarvis.

Botany, Fourth Year. Specialists in Biology and Horticulture. (a) Laboratory and lecture course in plant histology—by Mr. Henderson and Mr. Hotson ; (b) Laboratory course in fungi and plant pathology—by Mr. Lochhead and Mr. Jarvis ; (c) Seminary and practical course in plant physiology—by Mr. Lochhead.

Botany, Fourth year. Specialists in Agriculture and Biology. (a) Laboratory course in systematic botany—by Mr. Lochhead ; (b) Lecture and laboratory course in grasses and forage crops—by Mr. Lochhead and Mr. Jarivs.

Botany, Fourth Year. Specialists in Horticulture. (a) A laboratory course in the study of cultivated plants—by Mr. Lochhead.

Entomology, Second Year. A course of thirty-five lectures, demonstrations and practical exercises. The chief insect pests of the farm, orchard, and garden are discussed and studied, under Mr. Lochhead and Mr. Jarivs.

Entomology, Third and Fourth Years. This course, consisting of lectures and practicals, deals with both beneficial and injurious insects, and is a continuation of the second year course. Here the students become acquainted with the literature of the subject.—By Mr. Lochhead and Mr. Jarvis.

Zoology, First Year. This course consisted of lectures and practicals, thirty in all. The chief animal types from the Amoeba to Mammals are discussed, and much attention was given to the Birds and Mammals of the farm—by Mr. Henderson and Mr. Jarvis.

Zoology, Fourth Year. Specialists in Biology. A lecture and laboratory course—by Mr. Henderson.

Geology, First Year. A course of thirty lectures and demonstrations, dealing with the common minerals and rocks, the chief agencies operating in the formation of soils, and the geological history of the rock formation of Ontario—by Mr. Lochhead and Mr. Jarvis.

Geology, Third Year. This course is a continuation of the first year course; but it is of a more practical nature, because the class is smaller. Considerable attention is given to the formation of soils through glacial action; and the geological history of North America is studied with special emphasis on the Canadian region—by Mr. Lochhead.

I take pleasure in placing on record my appreciation of the valuable assistance rendered by my co-workers in this department. Mr. A. Henderson, B.A., resigned in September to resume his medical studies in Toronto, but we were fortunate in securing the services of Mr. J. W. Hotson, M.A., of McMaster University, an experienced teacher and a good botanist. Mr. T. D. Jarvis, B.S.A., Demonstrator, has been of great service in conducting the laboratory exercises in Entomology and Plant Pathology, and in arranging the department's collections of insects and plants.

The Herbarium and Insect Collections.

A good beginning has been made in arranging the mounted plants, but much requires to be done before the plant collections can be used to advantage by the students for the purpose of reference. Our collection of cryptogamic plants are still meagre in many regards. Our ferns, horse-tails, and club-mosses are fairly well represented; we have an incomplete assortment of fungi, and the Tilden collection of algae; but the mosses and liverworts are almost unrepresented.

Now that we know the weaknesses of our collections, it will be much easier to fill in the gaps.

We desire to thank the editor of the Farming World for donating several small but valuable collections of mounted flowering plants, as each was collected in a different part of the country.

Our insect collections are gradually growing, but we have not yet a reference collection of Diptera, Hymenoptera, or Coleoptera worthy of the name. In the absence of such a reference we, as well as the students, are often unable to identify with certainty many forms which are brought to our attention. Mr. T. D. Jarvis has spent much time in the collection of material for class work in Entomology, so that now we have specimens of most of the common and economic insects to give every student in laboratory work.

The Needs of This Department.

Although many of the urgent wants of this department have been supplied, yet there are still some very pressing needs. In an agricultural college such as ours,

practical instruction should be emphasized, and it is as true of the Biological studies as it is of the Agricultural or Horticultural.

We are now well equipped with class rooms and laboratories for the study of many phases of plant and animal life, but there is still lacking a greenhouse for experimental plant physiology, and for the study of the life-history of the insects. Without such a building, the most important phases of plant and insect life must be left untouched.

We need also many additions to our meagre supply of apparatus for experimentation in plant physiology.

Our needs are, therefore :

1. A greenhouse to serve as an insectary and a laboratory of plant physiology.
2. Additional apparatus for a class of 35 in plant physiology.
3. Five or six additional microscopes.
4. A more complete reference collection of insects.

Outside Work.

Through the kindness of the Minister of Agriculture and yourself, I was privileged in March to visit some of the schools of New York and New England which were devoting considerable attention to Nature Study. I spent three days at Cornell University where I discussed Nature Study problems with the officers of the College of Agriculture and with "Uncle John" Spencer. At the Teachers' College of Columbia University, New York City, I learned a great deal regarding the teaching of Nature Study in a practical way in the Horace Mann School attached to the Teachers' College. In Hartford, Connecticut, I had the privilege of seeing school-garden work done by the school children of that city, under the superintendence of Prof. Hemenway of the School of Horticulture. At Worcester, Massachusetts, I spent a very pleasant day with Prof. C. F. Hodge, who is an enthusiastic advocate of Nature Study in public schools.

In connection with the local movement for a consolidated school, I visited four of the sections in this vicinity early in the winter, and addressed the ratepayers on the advantages of a consolidated school system, basing my remarks on the observations I had made while on a visit with Prof. Robertson to the consolidated schools of Trumbull County, Ohio.

On September 3rd and 4th the annual meeting of the Entomological Society of Ontario was held in Ottawa. I presented the following papers : "Insects of the Season of 1903," and "The Present Condition of the San Jose Scale in Ontario," and I delivered the President's address, taking for my subject "The Progress of Economic Entomology in Ontario." I had the honor of being re-elected President for the coming year.

Under instructions from the Deputy Minister of Agriculture, I visited the Kottmeier orchard, St. Catharines, four times during the summer, to ascertain the effectiveness of the McBain Carbolic Wash against the San Jose Scale.

Acting also under instructions from the Deputy Minister of Agriculture, I paid several visits to Barrie on matters pertaining to the removal of barberry shrubs and the compensation of the owners for the destruction of their shrubs.

A hurried visit was made in August to the fruit sections of Kent and Essex for the purpose of studying the conditions of the orchards and the injuries done by insects and fungi.

Correspondence and Articles Contributed to the Press

As usual, the correspondence has been somewhat heavy during the year, more than one thousand letters having been sent out. The bulk of this correspondence had to deal with the common farm pests, such as weeds, insects, and fungous diseases. The following articles were contributed to the agricultural journals and papers :

"Scale Insects in Greenhouses," for the Canadian Horticulturist, February.
"School Gardens," for the Canadian Horticulturist, July.
"The Twig Blight of the Apple, Pear, and Quince," for the Canadian Horticulturist, August.
"The New Gooseberry Fruit Worm," for the Canadian Horticulturist, August.
"Tree Protectors," for the Canadian Horticulturist, August.
"The Spruce Gall Louse," for the Canadian Horticulturist.
"The Cottony Maple Scale," for the Canadian Horticulturist.
"Consolidated Schools," for the Farmers' Advocate, April 15th.
"Nature Study With Advanced Classes," for the Ottawa Naturalist, October.
"Nature Study," for the O.A.C. Review, February.
"The Twig Blight of the Pear," for the Weekly Sun.
"Nature Study and Country Life," for the Xmas O.A.C. Review.

Bulletins Published

The following bulletins from this department were published during the year :
"Peas and the Pea Weevil," in co-operation with Mr. Zavitz.
"The Weeds of Ontario," a revision of the bulletin entitled "Weeds of Ontario," prepared by Prof. Harrison and published in 1899.

Nature Study Class.

For the first time in the history of the College, the third year students devoted two additional months, from April 15th to June 15th, entirely to Nature Study. This was a new departure, but I do not hesitate to say that the results justify the departure. In this work I was aided by Messrs. Henderson and Jarvis of this department, and by Mr. T. Otway Page, B.A., of Guelph. The latter gentleman, who is well acquainted with birds, had charge of the excursions in bird study. More than sixty birds were recognized by the students and their habits noted. The studies made by the students covered a great many subjects. As far as possible no aid was given beyond some general directions. Careful drawings were required of every student, as well as a report on some nature topic at the end of the term. Each student was required also to give a popular address before the class upon some topic which he had studied.

Prof. J. W. Robertson did us the honor to send ten of the MacDonald teachers in training for instruction in Nature Study. These gentlemen devoted most of their time to birds, field excursions, and garden work. No formal lectures were given by the regular instructors, but the class had the pleasure of listening to two admirable lectures on certain aspects of Nature Study by Prof. Lloyd of the Teachers' College, Columbia University, New York. It was my aim throughout to make the students investigators, and to get them into full sympathy with their surroundings. I feel that the course was a valuable one for the students, and that it should be made a permanent feature of the College.

The Museum.

Little has been done towards the fitting up of the Museum since my last report was written, on account of the want of suitable cases in which to display the specimens. We hope, however, to be able soon to place some of the birds and rocks in the few new cases purchased by means of an appropriation made at the last session of the Legislature. An extra appropriation for the additional cases and cabinets will be asked for from the next Legislature.

The following collections were added to the Museum during the year :

1. The Hon. G. W. Allan Collection of Birds, 258 specimens, especially strong in aquatic forms.

2. The A. Gibson Collection of Lepidoptera, comprising nearly 2,000 specimens.

3. A collection of Pacific Coast Fishes from New Westminster, B.C., generously sent by T. F. Patterson, B.S.A., formerly Fellow in Biology at this College.

4. A small collection of specimens of Gold Ore from the Woodstock Mining Company's mines, Guysboro' County, Nova Scotia, presented by B. E. Patterson, B.S.A.

5. The skin of a rattlesnake, presented by Captain MacMaster, Department of Agriculture, Toronto.

6. The Thomas Otway-Page Collection of Birds' Nests and Eggs, donated by T. Otway-Page, B.A. This is a most valuable collection of the nests and eggs of our native birds, collected with great care, and with greater patience, by the donor. In connection with this donation is a series of colored drawings of the birds, made by Miss Holliday, Guelph. For purposes of reference and Nature-study, it is one of the most valuable collections in the Museum.

A liberal annual appropriation for the purchase of desirable collections and specimens is urgently needed to make the Museum an educational factor in college work and a place of interest for our many visitors.

Mustard Spraying.

In 1901 and 1902 Mr. M. W. Doherty, late Associate-Professor in this department, gave valuable demonstrations at many points in the districts badly infested with mustard. The reports of these demonstrations are to be found in the annual reports of the Ontario Agricultural College for those years.

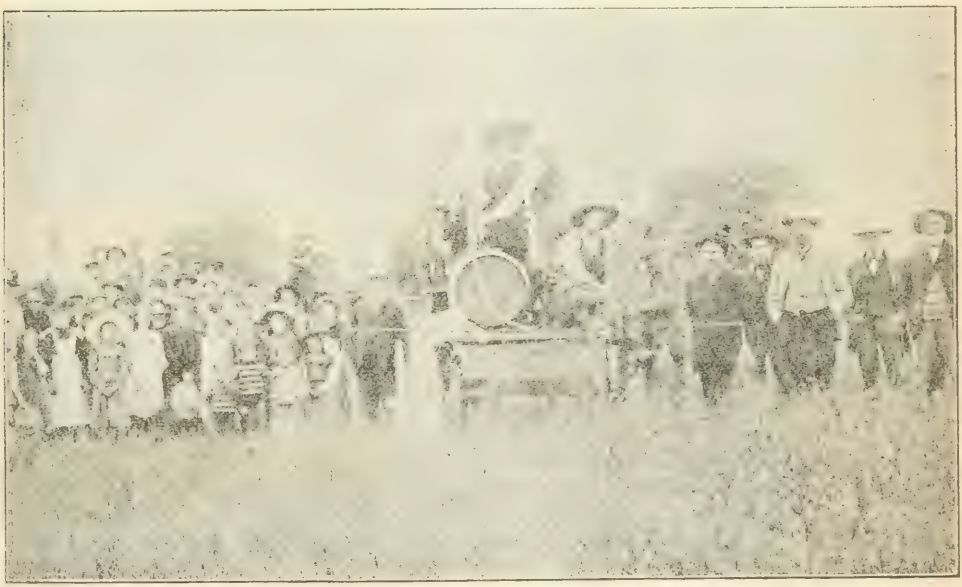


Fig. 1. A demonstration in mustard spraying at Markham on the farm of Reuben Lunau. June 16, 1903.

In 1903, at the request of the Minister of Agriculture, this department undertook to give practical demonstrations in killing mustard by spraying with bluestone in some of the districts infested with wild mustard. Mr. F. W. Brodrick, B.S.A., had charge of the demonstrations in the counties along Lake Ontario east of Toronto, and Mr. D. H. Galbraith, B.S.A., those in the central counties, viz., York, Ontario, Simcoe, Peel, and Dufferin. Through the courtesy of the Spramotor Co., of London, they were supplied with complete spraying outfits.

Printed copies of the following circular were distributed freely among the farmers who witnessed the demonstrations.

Killing Mustard with Bluestone.

(Read carefully and preserve for reference.)

The demonstrations given throughout Ontario for the destruction of wild mustard have proved that, in the majority of cases, under favorable conditions, spraying with copper-sulphate almost entirely eradicates this troublesome weed from growing cereal crops.

I. How the Bluestone is Applied :—Place an ordinary spray pump, to which is attached the 6-row sprayer, on a cart or light wagon; drive along slowly through the field, applying the solution to the mustard plants in the form of a fine spray. When the field is badly infested, it is advisable to spray the crop in strips in order that no mustard plants may escape the spray.

II. How the Bluestone Solution is Made:—Put nine (9) pounds of Bluestone (Copper Sulphate) in a coarse sack or bag, and suspend it in a vessel containing three (3) gallons of very hot or boiling water. The Bluestone will usually dissolve in 15 or 20 minutes. Strain the solution into the barrel of the spray-pump, and fill up with cold water to make 40 or 45 gallons.

III. When to Spray the Mustard Plants :—Spray the Mustard on a calm, bright day, just as the plants are coming into bloom. Should a heavy rain come immediately after spraying, it will be necessary to spray again.

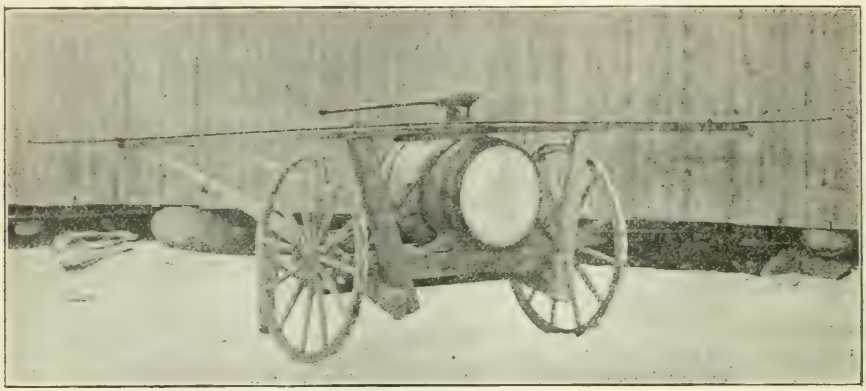


Fig. 2. A spraying outfit arranged by Thos. Thomson, Headford.

IV. How Much is Required to Spray an Acre Thoroughly ?—A barrel of the solution, costing about eighty or ninety cents, is sufficient for an acre. Successful results are obtained when the spraying is done thoroughly.

V. Are the Crops in Which Mustard is Growing Hurt by the Spray?—Experience shows that young wheat, barley, oats, or clover plants are not injured, beyond a slight browning for a few days by the Bluestone spray.

For further information write to The Biological Department, Ontario Agricultural College.

Guelph, June, 1903.

The demonstrations were not uniformly successful, but it was shown that the failures were mainly due to rain soon after the spraying operations. In every case reported to us, when rain did not fall for 36 or 48 hours after spraying, the operating was completely successful; but when rain fell within a few hours after the demonstration a certain percentage of the mustard plants was not killed. The demonstrations proved also the value of early spraying, for the best results were secured in every case when spraying was done just when the plants were coming into bloom.

Following are the dates and places of the demonstrations given by Mr. Brodrick, and a few of the reports received :

June 8.—I. Langmaid's, near Whitby. Mustard partly in bloom and too far advanced ; oat crop 10 to 12 inches high.

Report of Committee re Spraying on Isaac Langmaid's Farm.—"The mustard plants were too far advanced. However, nearly every plant was killed inside of a few days. A few of the oldest plants lived some time, but matured few or no seeds. A slight browning of the grain crop took place. At first the leaves of the thistles and wild buckwheat turned decidedly brown, but they were not killed. There was no apparent injury to the crop of grain or to the clover. The demonstration showed conclusively that when properly done under favorable conditions the mustard can be killed by spraying with copper sulphate. (Signed) Isaac Langmaid, James Langmaid, Elmer Lick."

June 9.—Wm. Banks, near Pickering: A little rain fell in the afternoon; oat crop 6 to 7 inches high; mustard in bloom and rather far advanced.

June 10.—Wm. Tordiff, near Brooklin: Day cold but clear; oat crop about 10 to 12 inches high; mustard nearly all in bloom.

June 11.—T. Wright, of Scarboro': Weather threatening and plants wet; oat crop about 9 inches high; mustard thick and coming into bloom.

Mr. Wright's report: "July 16th, 1903. I am sorry to say that the bluestone did not destroy it all. My opinion is that if it was done a little earlier and in favorable weather it might have succeeded, for where the mustard was not so old it was killed. Thos. Wright."

June 13.—A. E. Bellman, Bowmanville: Weather clear, but it had been raining the previous night; mustard well advanced.

Mr. Bellman's report: "Bowmanville, July 24, 1903. It rained several showers that day before spraying, and also about 24 hours after. We tried spraying in two different pieces of grain in which the mustard was in two different stages of maturity—one in which the mustard was fully out in bloom, and the other piece only partially out. It seemed to have killed both pieces to about the same extent. I would think about 90 or 95 per cent. was killed. It seems to be a very particular job, to get it applied properly. The applying of it is one of the most important part of the business, for if a nozzle gets choked, or you drive a little too far away, or, in fact, if you do not get it on in sufficient quantities, most likely you will not detect it at the time of spraying, but in three or four days you will have no trouble in seeing every slip or failure. There is no doubt that it will kill the mustard if you get it on in sufficient quantities. The mixture does slightly burn the grain when applied. A. E. Bellman."

June 15.—J. S. Walker, Welcome, near Port Hope: Weather fine; oats 10 inches high; mustard higher and in bloom; a little too far advanced.

June 16.—Edwin Macklin, Cobourg: Weather clear and warm but threatening; oats 10 inches high; mustard in bloom and too far advanced; rained following night.

Mr. Macklin's report: "Cobourg, Aug. 11th. The spraying which Mr. Brodrick did for us we considered a success. Had it not been for the heavy rain which fell about six hours after the work was done, I think it would have been killed completely. As it was, I think, as near as I could judge, about 85 per cent. was killed, or possibly a little more than that. The tips of leaves of goose wheat, the crop sprayed, were just slightly browned, but it soon passed off, so I would say the wheat was not injured. It did not have the slightest effect on wild vetches or tares. The grain, as well as the yellow-weed, was very large when sprayed. Ernest E. Macklin."

June 17.—J. L. Grosjean, Grafton: Dry and cloudy and rather cold; oats about 12 inches high; mustard higher and too far advanced.

June 18.—P. W. Brown, Colborne: Day wet but clearing; mustard in good stage for spraying.

June 20.—H. Herrington, Brighton: Day cool and cloudy; began to rain about 7 p.m.; mustard coming into bloom.

June 22.—G. A. White, Trenton: Day fine and clear; both wheat and oat crops treated; mustard too far advanced.

Following are the dates and places of demonstrations given by Mr. Galbraith:

June 10.—Jas. McNaughton, Gourock: rain fell the night following; not a success.

June 11.—W. Lewis, Malton.

June 13.—S. M. Kennedy, Uxbridge.

June 15.—S. Ross, Ellis' School; R. Sproule, Cannington.

June 16.—R. Lunane, Markham.

June 17.—P. Christie, Manchester.

June 20.—R. Stewart, Badford.

June 22 and July 2.—W. Rintoul, Whittington.

June 25 and 26.—J. Ross, Simcoe County Farm, Beeton.

Mr. Munro's report: "Port Perry, Dec. 24th, 1903. Last year we sowed early peas in the field that we sprayed this year, and the mustard nearly choked them out. This year it was worse if possible. We had barley sown in the place of peas. In a few days after spraying you could not see any mustard a short distance off. Our crop of barley yielded about 30 bushels. I think the spraying is a benefit to the crop, as we sprayed a small piece first, and it was the heaviest barley in the field. John Munro."

Mr. Christie's report: "Manchester, Jan. 2nd, 1904. I may say that we had no chance to make a test, as it rained nearly all day, and Mr. Galbraith had to leave the next morning for some other point. We mixed a small quantity and applied it with our orchard sprayer on some barley, and it killed the mustard without any damage to the barley. I am satisfied the mixture is all right. Peter Christie."

Mr. Rintoul's report: "Whittington, Dec. 24th, 1903. Regarding the report of the work done by Mr. Galbraith, we cannot speak definitely, as the climatic conditions were against us at both of the trials. The first trial was scarcely finished an hour when it commenced to rain, thus washing the solution off the plants; still the effects were easily noticed. The mustard plants were all covered with little dead yellow spots, but not sufficient of them to kill the plants. At the next demonstration the plants were all flowered out, and the solution was on about four hours when it came on rain; quite a number of the smaller plants were killed, but the large and healthy ones did not seem to be much harmed. The thistles were all blackened and wilted. The blades of the grain were yellow, but they were not injured. As far as I could judge, I think it would be a success in destroying the mustard plant. W. Rintoul."

Experiments With Other Chemicals.—As good results were secured in 1902 in Wilts County, England, by using commercial muriate of potash and nitrate of soda in the eradication of mustard, it was thought advisable to determine the value of these chemicals when applied on mustard in Ontario. Although the experiments were not conclusive, yet the results show that with further experimentation something of value may be obtained.

Experiment No. 1.: Sprayed June 20th an acre of mustard with a solution composed of 2 per cent. copper sulphate and 6 3-4 per cent. murriate of potash. The mustard was well advanced, but no rain fell for several days following the application. The mustard was entirely killed. The leaves began to wilt within 24 hours after spraying.

Experiment No. 2: Sprayed a small plot with a mixture composed of 2 per cent. copper sulphate and 11 per cent. muriate of potash. Rain fell three hours after spraying. Excellent results were secured. The leaves of the mustard plant began to wilt within a few hours after treatment.

Experiment No. 3: Sprayed a small plot with a solution composed of 2 per cent. copper sulphate and 11 per cent. nitrate of soda. Good results were obtained. The mustard was killed, but not so quickly as in experiment No. 2.

Experiment No. 4: Sprayed a small plot with a solution composed of 5½ per cent. muriate of potash and 5½ per cent. nitrate of soda. Only a small percentage of the mustard plants were killed. In this experiment, rain fell within three hours after spraying.

Experiment No. 5: Sprayed a small plot with a 22 per cent. solution muriate of potash. Rain fell within three hours after spraying, and but few mustard plants were killed. It may be stated that the use of these chemicals increases the cost of the application about three times, or about $2.50 per barrel.

Three New Weeds.

Within recent years, and since the opening of the great west, many western plants have been introduced into Ontario through the use of western grain and forage seeds. With the cultivated plants have come also some of the western weeds; among which

are the Russian Thistle, Great Ragweed, Buffalo Bur, Wild Barley, Rosin plant, Prickly Lettuce, Bracted Plantain, and others. Of these, we may now speak of Wild Barley, Rosin Plant, and Bracted Plantain.

Fig. 3. Squirrel Tail or Wild Barley (*Hordeum jubatum*). A single cluster of plants. (Photo. by Charlotte M. King.)

1. Wild Barley (Hordeum jubatum. Fig. 3), is characteristically a weed of the meadows and pastures, and of the prairies of the Mississippi valley. It is a winter annual, and grows to a height of two feet ; but commonly it is not more than eight or nine inches in height. The roots are fibrous, and make a well formed sod. It stools very freely, and forms solid and compact bunches, each of which may produce from 300 to 2,000 mature seeds. The flowers are arranged in spikes from two to four inches long,

and resemble heads of common barley. The seeds are scattered by the wind and by animals. They often cause much injury to stock.

Cultivated land is seldom injured by Wild Barley. When it occurs in pastures and meadows, the grass should be cut young and not allowed to seed. If this precaution is taken for a few seasons, the Wild Barley will soon disappear.

Wild Barley is a pernicious pest in Manitoulin Island, and in the upper lake region.

2. Rosin Plant (Grindelia squarrosa), is also a native of the prairie region. It resembles a sunflower which has received a coating of glue or some other sticky substance.

This weed is very common west of the Mississippi, and is gradually extending eastward. In Colorado, where it has been known for a long time, it invades cultivated fields, and locally is very troublesome in corn land. It is also rapidly spreading into fields and upland meadows in Manitoba.

Figure 4 shows one of the "seeds," or achenes, of the Rosin Plant. The seed is about 1-10 of an inch in length, somewhat flattened, and four-angled; somewhat narrowed at the base, where there is a distinct white scar; the color is light brown to cream.

3. Bracted Plantain (Plantago aristata) is one of the newest weed arrivals in Ontario, so far as I am aware. Specimens were sent me from Kent. It resembles to a limited extent the narrow-leafed plantain, or rib-grass, which is so common with us. The main difference is in the spike of flowers. In the Bracted Plantain, the flowers of the spike are subtended or intermingled with bracts or short narrow leaves. The seeds are dark-brown, one being shown in Figure 5. They are about 1-12 of an inch long, and rounded on the ends. The rounded outer face is marked by a shallow transverse groove near the middle; and the inner face is grooved, with a scar near the middle.

Fig. 4. Seed of Rosin Plant.

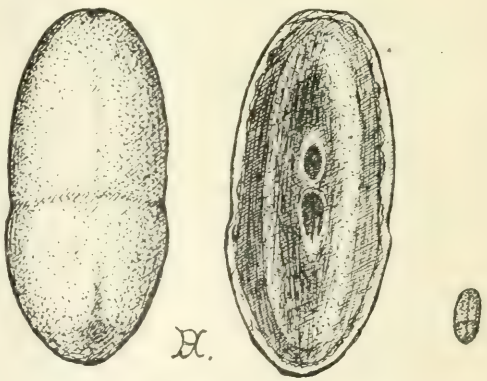


Fig. 5. Seeds of Bracted Plantain.

As this plant is a winter annual or a biennial, fall cultivation and care in sowing clean seed will keep it in check, if it ever becomes a serious pest.

Egyptian-Pea Blight.

An interesting, and at the same time a very destructive blight fell upon the plots of Egyptian Peas in the Experimental Grounds of the College during the summer. On August 8th, when I visited the plots, practically all of the Egyptian Peas (Cicer arietinum) were diseased, and the survivors of the epidemic were few in number. Pods had formed on many of the plants; but the seeds within were shrivelled and undeveloped. The disease affected the stems and leaves as well as the pods. Fig. 6 shows the appearance of an affected pod. The spots are brown and dry; they are roundish to oval and irregular in outline; and many of the spots have rings of black specks, more or less concen-

tric. When examined under a low power of microscope, each speck when isolated is of a dark-brown color, is hemispherical in shape, and has an opening or mouth at the apex.

These hemispherical, brown bodies are the fruit-bodies, termed pycnidia, and they

Fig. 6. Egyptian Pea Blight. The characteristic spots on the pods × 2. (Original.)

contain the spores by means of which the disease is spread to other plants. Each pycnidium is composed of a dark-brown wall, formed of sterile threads of the fungus; and from the inner sides project the stalks bearing the spores. (Fig. 7).

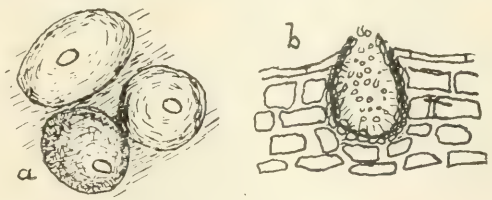


Fig. 7. (*a*) The pycnidia of Egyptian Pea Blight; (*b*) section of a pycnidium showing how it imbedded in the tissue of pod; greatly magnified. (Original.)

The spores are transparent and colorless, oblong in shape, and mostly one-celled at the time the diseased specimens were collected. Only a few spores were two-celled. The dimensions of the spores ranged from 12 to 16 microns long by 4 to 6 microns wide. At maturity, the spores are extruded through the mouth of the pycnidium in long viscid tendrils. On exposure to air, the mucilage dries and the spores are set free. The pycnidia are 130 to 160 microns in diameter.

The fruiting characters of this fungus resemble both Phyllossticta and Ascochyta. The unicellular spores are like those of Phyllosticta; but the diameter of the pycnidia and the parts of the plant affected would make it Ascochyta. It is very probable that the spores were immature when the specimens were collected; if so, then I would be inclined to believe that the fungus which destroyed the Egyptian Peas of the experimental plots is Ascochyta pisi, a common blight of the cultivated pea (Pisum arvense).

The Raspberry Cane-Blight

Early in August, I was asked by Prof. F. C. Stewart, Botanist of the Geneva Agricultural Experiment Station, to report as to the presence of the Raspberry Cane-Blight in the College raspberry plantation. On August 10th, I examined the plots and found

many of the fruiting young canes attacked by fungus. Besides the anthracnose spots, which are well known, there were light-colored areas marked with black specks, and dark-colored regions where the bark was broken, and the wood brown and brittle. The light-colored areas are produced by a fungus called Sphaerella ; and it appears that it

Fig. 8. Raspberry Cane Blight on Pride of Geneva.

The fungus attacked and killed the cane at the point indicated by the arrow. As a consequence, all foliage above this point withered. (After Stewart.)

does but little damage to the canes. Much harm, however, is done by the fungus which produces the dark brittle areas. We found in the College plantation, after examination, that considerable harm had already been done. In some cases, the leaves on the affected canes were dead and withered, while in others but few leaves were involved. It was not possible at that date to make out the manner of inoculation and spread; but Prof. Stewart, of Geneva, who has devoted considerable time to the study of this disease in New York where much harm has been done during the last three or four years, describes the working of the fungus as follows:

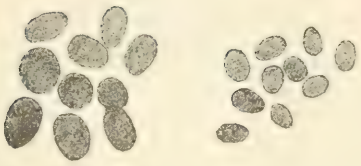


Fig. 9. The spores of the Raspberry Cane Blight (*Coniothyrium*), greatly magnified. (After Stewart.)

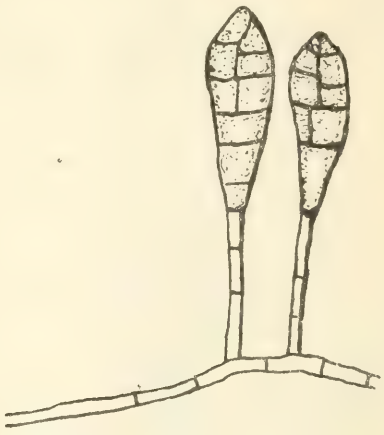


Fig. 11. Spores of Early Blight; greatly magnified. (Original.)

"With black caps the disease frequently starts in the old stub left in pruning. From this point it gradually works downward, killing first the uppermost branch, then the next lower one, and so on until by the close of the berry harvest one-half or more of the cane may be dead. On black caps, the disease also shows a tendency to work down one side of the cane, killing the bark and discoloring the wood on that side, while on the other side the bark remains green. This may occasionally happen with the red varieties, but as a rule they are attacked at some particular point on the cane. Here the bark is dead and the wood brown. For some time the injury extends only part way round the cane, and as long as there is a strip of green bark left connecting the parts above the point of attack with those below all goes well; but when the injury at length completely encircles the cane the leaves on the portion above the injury suddenly wilt and die. (Fig. 8.) By the time this happens, the cane at the point of attack is dead throughout a section which is usually from two to four inches in length. Both above and below this dead section the cane itself may be normal, with nothing to indicate the cause of the sudden wilting of the leaves. However, a cane may bear several of these dead sections of various sizes. If the point of attack is near the ground the whole cane dies; if higher up, only a part of it. When part of a cane dies while the remainder continues alive, the point of attack is to be sought at the boundary between the dead and living portions. Usually, the seat of the difficulty may be located by the color of the bark, which is somewhat different from that on the rest of the cane. For the most part it is lighter colored and smutty, with smoke-colored patches of exuded spores. (Fig. 9.) In many cases numerous minute pimples, the pycnidia of the fungus, are visible. By cutting into the cane with a knife the matter may be decided at once. Where the cane is diseased the wood is strongly discolored. A marked charcteristic of cane blight is the brittleness of the cane at the point of atttack." (Bulletin 226, N.Y. Ag. Exp. St., Geneva.)

Remedial Treatment: Professor Stewart, of Geneva, writes me that it seems improbable that the disease can be prevented by spraying. In 1902, he sprayed infested Cuthbert raspberries three times, during the spring, with Bordeaux Mixture. "From ob-

servations made on August 2nd, it was plain that spraying did not check the disease. Apparently, there were as many dead canes in the sprayed rows as there were in the unsprayed ones." His experiments in 1903 on spraying with Bordeaux Mixture have given practically the same results as were obtained in 1902. He recommends that the following precautions be observed : (1) To secure healthy plants with which to start the plantation ; (2) To remove the old canes immediately after the fruit is gathered.

The Two Blights of Potatoes.

The Early Blight of potatoes is frequently mistaken for the Late Blight, or potato rot : but the two diseases are in reality quite distinct and are caused by different fungi. There are a few characteristic differences which readily distinguish the two potato blights.

Fig. 10. Early Blight.

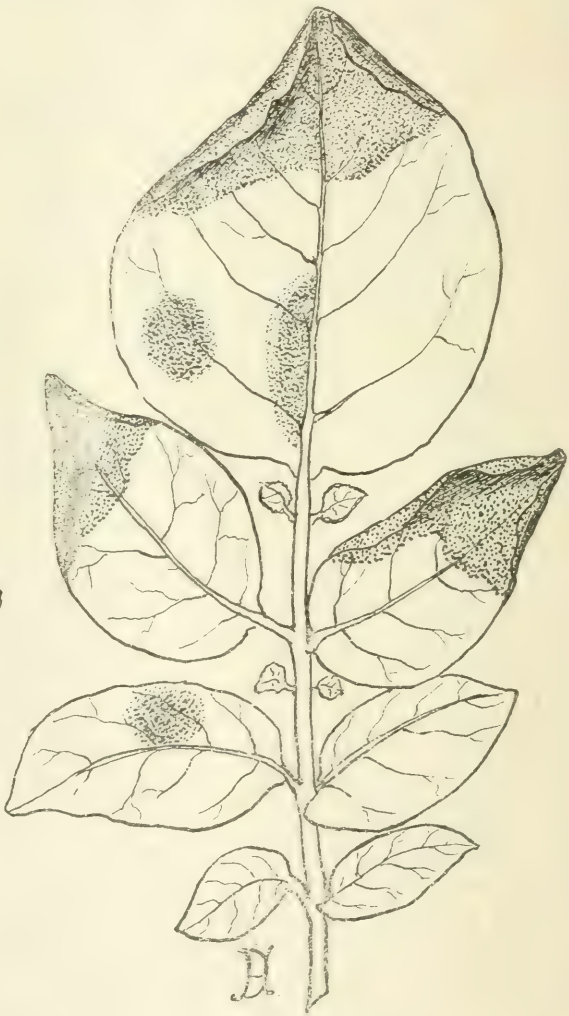


Fig. 12. Late Blight.

First, the size, shape, and position of the diseased areas are quite distinct. In the Early Blight, these areas are small and circular, except where several have run into each other, in which case the diseased areas will be irregular in outine. The leaf diseased or in-

fected by the Early Blight gives one the impression of having been infected at a large number of points. Second, the diseased spots of Early Blight have frequently slight elevations arranged in circles. Third, the leaf affected with Early Blight becomes gradually discolored, has considerable yellow areas, and there is no distinct line of demarcation, as with the Late Blight, between the sound and the diseased tissues. Moreover, the edges of the leaflets affected by the Early Blight have a strong tendency to curl. Fourth, the Early Blight appears earlier in the season than the Late Blight. (See Fig. 10).

Observation shows that the Early Blight is much more severe on the early varieties than on the later-planted varieties. Frequently it has been observed that the early varieties are badly affected, while the later varieties are practically unaffected. In this regard, it appears that the vigorous, growing plants are practically free from the blight, while those which have almost completed their growth are readily attacked. Again, the Early Blight appears to attack potatoes grown upon dry soil rather than those grown under moist conditions, and it is in dry weather that this disease makes the most rapid progress. The Late Blight, on the other hand, requires a moist atmosphere for its development.

The presence of a large number of flea-beetles is no doubt an important factor in the spread of the Early Blight. These minute insects eat small holes in the leaves, and these seem to be the centres of infection. Moreover, plants which have their leaves badly eaten (into pin holes) by the flea-beetles, have their vitality gradually reduced, and are in consequence more susceptible to the Early Blight.

During the later stages of the disease the leaves gradually become brown and shrivelled, the stems become yellowish-brown and dry, and in a short time nothing remains but a few withered leaves and stalks, and a number of small, half-developed tubers. These tubers do not rot; but on account of the death of the tops, they remain small through lack of nourishment.

With regard to treatment, a combination of Bordeaux Mixture and Paris Green is usually quite effective. This mixture should be applied when the plants have reached the height of three or four inches, and should be repeated every two weeks through June and July. The object of the Paris Green is to control the flea-beetles, and of the Bordeaux to prevent infection by the fungus spores. (Fig. 11)

2. The Late Blight of Potato or Potato Rot, under certain conditions, spreads with great rapidity, and causes the destruction of large areas of potatoes in a few days. Such conditions are a temperature of 70 degrees F. and a close damp atmosphere in August and September. On the other hand, a hot dry atmosphere checks the development of the disease. Fortunately, in Ontario the conditions favorable to the development and spread of this very destructive blight do not often occur.

A close study of leaves affected with this blight will usually reveal the following decided peculiarities: First, the edges are most commonly the first portions of the leaves to become diseased, probably because in periods of excessive moisture the edges are kept longer moist than the inner parts. Second, there is a sharp line of demarcation between the affected and unaffected areas; and in moist, warm weather when the affected areas are enlarging rapidly, there is a narrow whitish ring between the two areas, which on close examination shows the fruiting bodies of the fungus. Figs. 12 and 13).

It is usually supposed that this fungus attacks the tubers as well as the stalks and leaves; but the mode of infection has not been definitely proven. The threads of the fungus may grow down through the stem and along the root-stocks to the tubers; or, the spores from the diseased leaves may be carried by rain, etc., to the tubers, which soon become infected.

It is not definitely known how this fungus winters, inasmuch as wintering spores (Oospores) have not been observed. It is very probable that the threads (mycelia) of the fungus live over winter in the affected dormant tubers, and from these the following season make their way back to the stalks and leaves.

Remedial Treatment. As a matter of experience, the Late Blight is more readily combatted than the Early Blight is. Bordeaux Mixture is the sovereign remedy. If the potatoes are thoroughly sprayed every two weeks, beginning about the middle of July, and continuing up to the middle of September, very little trouble will be experienced in growing large crops of healthy potatoes.

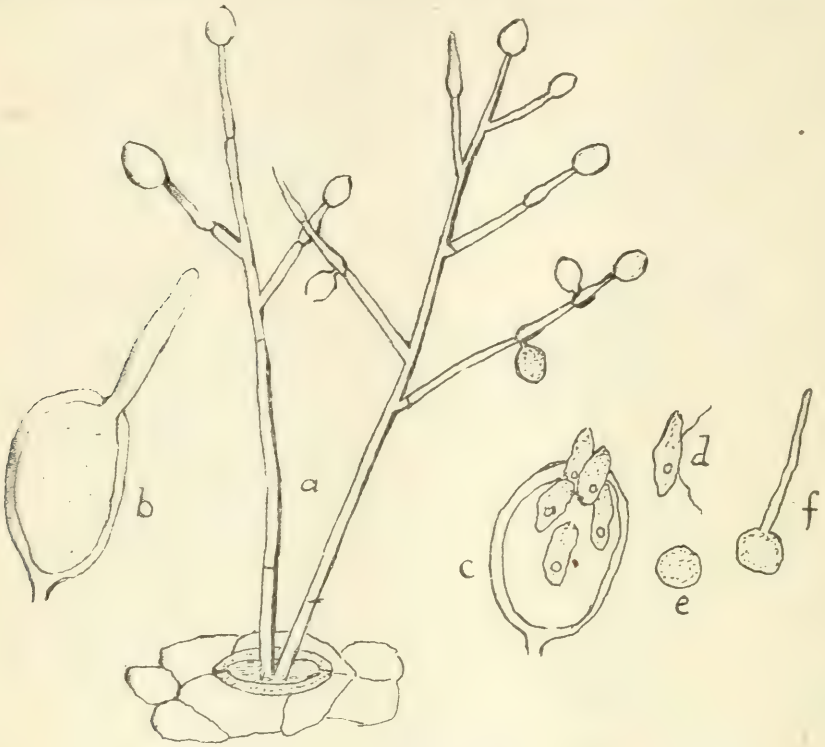


Fig. 13. The fruiting organs of Late Blight.

(*a*) The branching stalks which issue from a breathing pore of the leaf, and the spores. (*b*) A simple spore or conidium germinating. (*c*) A sporanguim with contained zoospores. (*d*) A zoospore with its two whips. (*e*) A zoospore after losing its whips. (*f*) A zoospore germinating. (All magnified.)

Injurious Insects.

I have dealt elsewhere (in the Annual Report of the Entomological Society of Ontario) with the chief injurious insects of the farm, orchard, and garden for the season of 1903. Bri fly, however, I may state that the year 1903 has not been marked by many serious outbreaks, and most crops have not suffered to any large extent from insect depredations. The Hessian Fly and Pea Weevil are no longer destructive ; the San Jose Scale is more destructive than ever before, but the fruit growers are fast coming to the conclusion that the insect must be fought by the application of right measures. The second brood of the Codling Moth did a great deal of harm in the latter part of the season ; and the Apple Aphis was one of the most destructive insects in the Grimsby-Burlington district.

On account of the prevalence of the Pear Tree Psylla in the Grimsby-Burlington district during the past season, and the fear that it will become a decided pest in 1904, I am taking the liberty of giving the latest information regarding this insect.

Pear Tree Psylla.

Reports from Grimsby and Burlington state that the injury done by the Pear Psylla was very marked during the past season, and fears are entertained that much damage may be done to the pear orchards the coming season.

The Pear Psylla was probably introduced into Ontario about 1890 or 1891 from infested New York nurseries. At that time the pear orchards of New York suffered very severely from the attacks of this insect.

It is not difficult to detect the presence of the Psylla in an orchard. The leaves droop, turn yellow, and drop early in the season, while the fruit falls before it is half grown. More conspicuous even is the abundance of "honey-dew," which covers all parts of the trees and is a secretion of the insect. This honey-dew is clear liquid that is exuded, but soon becomes covered with a black fungus growth, which gives the tree the appearance of being coated with soot.

The adult Psylla is a very minute insect. Its color is red, with several black bands across the abdomen. On account of its jumping habit it is often called The Jumping Louse. (Fig. 14).

Fig. 14. (*a*) Adult winged Pear Psylla; (*b*) Nymph or young form of the same insect, much magnified. (After Slingerland.)

Its life-history may be given as follows: The adult winged insect passes the winter hidden in the crevices of the loose bark on the tree. In early spring, about the end of April, the eggs are deposited, usually about the base of the terminal buds of the previous year's growth and in the crevices of the bark. They are light yellow in color and are stalked, provided with a thread-like process. In about three weeks all the eggs are hatched and the young Psyllas can be found feeding at the axils of the leaves. In about thirty days after hatching (about June 15), they become mature, and in another week the egg-laying commences again. There are practically three summer broods of this insect.

On account of the larger size of the adult wintering form, it was formerly supposed by many observers that the summer forms and the winter forms were distinct species.

This insect may be controlled at different times of the year and by different insecticides.

1. Wintering adult forms being inactive, readily succumb to treatment. Among the insecticides which may be used to advantage are: Kerosene emulsion (dilute from seven to nine times), whale oil soap solution (one pound in one gallon of hot water.) lime-sulphur mixture, and crude petroleum. It is necessary to wet the trunk and limbs thoroughly to destroy the hibernating forms.

2 About May 15th, when the spring brood has just hatched, the young lice are very readily killed by such solutions as kerosene emulsion. Treatment during the summer is not recommended, as the adults are very active, and the large amount of honey-dew prevents ready access to the limbs and foliage.

Respectfully submitted.

W. LOCHHEAD,

Professor of Biology and Geology.

BIRDS OBSERVED BY WELLINGTON FIELD NATURALISTS CLUB, 1903.

(T. D. Jarvis, B.S.A., President ; A. B. Klugh, Secretary.)

COMPILED BY THE MEMBERS.

NOTE.—All remarks given below apply to this year only. When a species is enumerated twice the first line refers to the spring migration, the second to the fall.

S—In several. F—In flocks.

Name of bird.	First seen.	About how many were seen.	Next seen.	Became common	Last seen.	Common or rare.	Does it breed near your station.	Remarks.
Chickadee				Res'dt.		C		
White-breast Nuthatch				"		C		
Downy Woodpecker				"		C		
Hairy Woodpecker				"		C		
Brown Creeper				"		C		
Pileated Woodpecker				"		Rare		
Junco				"		C		Abundant in spring.
Am. Goldfinch				"		C		
Horned Lark				"		C		
Crow				"		C		
Blue Jay				"		C		
Ruffed Grouse				"		C		
Screech Owl				"		C		
Great Horned Owl				"		Fairly C		
Saw-whet Owl				"		Scarce		
American Goldeneye	Jan. 19	1	April 1		April 30	Fair'y C	No	Visitor during migrations.
Cooper's Hawk	" 19	1	Feb. 6		Oct. 29	"	Yes	Common during open winter 1902-3.
Long-eared Owl	Feb. 6	1	May 30		May 30	Scarce		
Bluebird	Mar. 9	S	Mar. 11	Mar. 15	Oct. 21	C	Yes	
Song Sparrow	" 10	S	" 12	" 14	" 21	C	"	
Killdeer Plover	" 10	1	" 13	" 16	" 21	C	"	
Robin	" 11	S	" 12	" 13	Nov. 30	C	"	
Golden-crowned Kinglet				Win. res		C		
Bronzed Grackle	Mar. 11	2	Mar. 16	Mar. 17	Oct. 11	C	Yes	
Meadow Lark	" 16	1	" 18	" 18	" 19	C	"	
Red-shouldered Hawk	" 17	1	" 20	" 30	" 3	C	"	
Rusty Blackbird	" 17	F			" 28	C	No	
Flicker	" 19	1	" 28	Mar. 31	Sept. 30	C	Yes	
Canada Goose	" 20	F	" 25				No	
Cowbird	" 20	F	" 21	Mar. 26	Oct. 3	C	Yes	
White-rump Shrike	" 26	3	" 28		Aug. 17	Scarce	"	Very scarce this year.
Red-winged Blackbird	" 26	S	" 28	April 1	Oct. 24	C	"	
Phoebe	" 26	3	" 29	Mar. 30	" 3	C	"	
Winter Wren	" 26	1	" 31	April 4	Nov. 12	C	"	
Wood Duck	" 27	2			Rare			
Marsh Hawk	April 1	2	April 15		Sept. 16	C	Yes	
Vesper Sparrow	" 1	1	" 6	April 10	Oct. 21	C	"	
Am. Scaup. Duck	" 1	S			" 11	Scarce	No	Not as many noted as usual.
Black Duck	" 1	S	April 25		" 25	"	"	
Pied-billed Grebe	" 1	7			" 25	Fairly C	"	
Am. Herring Gull	" 1	1	April 4		Nov. 11	Scarce	"	
Buffle Head	" 1	S	"		"	"	"	
Ruby-crowned Kinglet	" 2	F	April 4	April 21	May 5			
Ruby-crowned Kinglet	Sept. 11	1	Oct. 3	Oct. 3	Oct. 14	C	No	
Purple Finch	April 2	1	April 5	April 18	Oct. 3	C	Yes	Common migrant. Scarce breeder.
Kingfisher	" 8	1	" 17	" 21	" 29	C	"	
Gt. Blue Heron	" 11	30	" 29		Sept. 23	Fairly C	"	Not as numerous as usual.
Tree Swallow	" 13	2	" 16	April 19	Aug. 17	C	"	
Yellow-bellied Sapsucker	" 16	1	" 18	" 18	Oct. 3	C	"	Rare as breeder.
Fox Sparrow	" 16	F			" 30	Scarce	No	
Am. Sparrow Hawk	" 17	1	April 24		" 3	C	Yes	
Barn Swallow	" 18	S	" 20	May 9	Sept. 4	C	"	

BIRDS OBSERVED BY WELLINGTON FIELD NATURALISTS CLUB.—*Continued.*

Name of bird.	First seen.	About how many were seen?	Next seen.	Became common	Last seen.	Common or rare.	Does it breed near your station?	Remarks.
White-throated Sparrow	April 19	2	April 23	April 29	Oct. 12	C	Yes	Very com'n breeder.
Holboell's Grebe	" 19	1	" 20	.....	" 21	Rare	No	
Mourning Dove	" 20	1	" 21	.....	.....	Fairly C	Yes	
Chipping Sparrow	" 20	2	" 24	April 24	Oct. 15	C	"	
Wilson's Thrush	" 22	1	" 23	" 23	Sept. 11	C	"	
Am. Woodcock	" 24	1	" 27	.....	Oct. 30	Scarce	"	
Savanna Sparrow	" 24	C	.....	.....	" 3	C	"	
Am. Bittern	" 25	2	May 17	.....	Sept. 12	Fairly C	"	Not as numerous as usual.
Swamp Sparrow	" 25	1	" 1	May 1	.....	C	"	
Lesser Scaup Duck	" 25	F	April 30	.....	April 30	Scarce	No	
Chimney Swift	" 29	S	" 30	May 5	Sept. 5	C	Yes	
Black-th'd Green Warbler	" 29	1	" 30	April 30	" 30	C	"	Very com'on breeder and abundant passing migrant.
Black & White Warbler	" 29	S	" 30	" 30	" 13	C	"	
Water-thrush	" 30	S	May 4	" 30	Aug. 29	C	"	
Blue-headed Vireo	" 30	1	.....	.....	Sept. 20	Scarce	No	
Red-headed Woodpecker	" 30	1	May 9	May 10	" 9	Fairly C	Yes	Not quite as common as usual.
Myrtle Warbler	May 2	S	.....	.....	.....	Scarce	.....	
Myrtle Warbler	Sept. 5	S	Sept. 24	.....	Oct. 24	C	No	
Brown Thrasher	May 2	1	May 10	.....	Aug. 17	Scarce	Yes	
Yellow Warbler	" 4	F	" 5	May 8	" 17	C	"	Not as c'm'n as usual
Parula Warbler	" 4	S	.....	.....	.....	Rare	No	
Oven-bird	" 4	1	May 5	May 12	Sept. 22	C	Yes	
Kingbird	" 4	1	" 8	" 10	" 2	C	"	
House Wren	" 4	2	" 5	" 8	" 25	C	"	
Chestnut-sided Warbler	" 4	1	" 11	" 12	Aug. 17	Fairly C	"	Common migrant. Scarce breeder.
Warbling Vireo	" 6	1	" 9	" 15	Sept. 20	C	"	
Spotted Sandpiper	" 6	S	" 8	" 9	Aug. 12	C	"	
Nashville Warbler	" 9	C	.....	.....	Sept. 23	Fairly C	"	Common migrant. Fairly c. breeder.
Redstart	" 9	S	May 12	May 18	" 11	"	"	Common migrant. Scarce breeder.
Bobolink	" 9	S	" 10	" 11	Aug. 10	C	"	
Crested Flycatcher	" 9	C	.....	.....	Oct. 4	C	"	
Bank Swallow	" 9	S	May 9	.....	July 6	Fairly C	"	Very local.
Baltimore Oriole	" 10	1	" 13	May 15	Aug. 26	C	"	
Maryland Yellowthroat	" 11	1	" 16	.....	" 3	Fairly C	"	
Catbird	" 11	S	" 15	May 20	Sept. 22	C	"	
Scarlet Tanager	" 12	1	" 16	.....	" 23	C	"	Abundant during spring migr.
Yellow-th'd Vireo	" 12	1	.....	.....	" 1	Scarce	No	
Blackburnian Warbler	" 12	1	May 13	.....	May 18	.....	.....	
Blackburnian Warbler	Aug. 27	...	.....	.....	Sept. 1	Fairly C	No	
White-crowned Sparrow	May 12	1	.....	.....	.....	Rare	"	
Black-billed Cuckoo	" 12	1	May 18	.....	Aug. 12	Scarce	Yes	Very sc'ce this year.
Wood Thrush	" 12	S	" 17	.....	Sept. 13	C	"	Common migrant. Scarce breeder.
Red-eyed Vireo	" 13	S	" 14	May 13	" 24	C	"	
Canadian Warbler	" 13	C	.....	.....	" 11	C	"	
Rose-breasted Grosbeak	" 15	1	May 16	.....	" 1	Fairly C	"	
Purple Martin	" 17	2	June 4	.....	July 20	Scarce	"	A few p'rs nest at two buildings in city.
Magnolia Warbler	" 17	1	May 18	.....	May 22	"	.....	
Magnolia Warbler	Aug. 27	F. S	Aug. 28	Aug. 27	Sept. 23	C	No	
Mourning Warbler	May 17	1	May 1	.....	Sep. 16	Fairly C	Yes	Common migrant; scarce breeder.
Bay-breasted Warbler	" 18	S	.....	.....	.....	Scarce	.....	
" "	Aug. 27	F. S	Aug. 28	Aug. 27	Aug. 28	C	No	
Yellow-billed Cuckoo	May 18	1	June 19	.....	" 13	Rare	Yes	
Wood Pewee	" 18	S	May 19	May 19	Sep. 26	C	"	
Least Flycatcher	" 18	C	.....	.....	" 25	C	"	
Indigo Bunting	" 19	C	.....	.....	Aug. 7	C	"	

BIRDS OBSERVED BY WELLINGTON FIELD NATURALISTS CLUB.—*Concluded.*

Name of bird.	First seen.	About how many were seen.	Next seen.	Became common.	Last seen.	Common or rare.	Does it breed near your station.	Remarks.
Nighthawk	May 19	1	May 22		Sep. 19	C	Yes	
Loon	" 20	1				Rare	No	
Ruby-thd Hummingbird	" 20	2	May 30		Sep. 1	Fairly C	Yes	
Sharp-shinned Hawk	" 23	1	June 7		" 5	Rare	"	Scarce migrant; rare breeder.
Black-th'd Blue Warbler	" 24	2			" 25	"	"	
Cliff Swallow	" 25	S	May 31		Aug. 17	Fairly C	"	Very local.
Cedar Waxwing	" 29	S	" 30	May 30	Sep. 26	C	"	
Whip-poor-will	" 30	1				Rare	"	
Osprey	June 2	1	Sep. 2		Oct. 3	Scarce		
Blue-wing Teal	" 2	3				"	Yes	
Traill's Flycatcher	" 14	2			Sep. 12	"	"	Scarce breeder.
Least Sandpiper	July 16	S			Aug. 28	"	No	
Solitary Sandpiper	" 19	3	July 20		Sep. 2	Fairly C		
Green Heron	Aug. 7	1	Aug. 17		Aug. 26	Scarce		
Black-poll Warbler	" 17	F				Rare	No	
Sara Rail	" 17	S	Aug. 18			Scarce	Yes	
Virginia Rail	" 20	S				"	"	
Red breasted Nuthatch	" 26	F. S	Aug. 27		Oct. 4	C	No	
Philadelphia Vireo	" 27	3	" 28		Sep. 1			
Wilson's Warbler	" 28	F. S	" 29		" 12	Fairly C	No	
Broad-winged Hawk	Sep. 12	F	Sep. 13		" 21	"	"	
Red-tailed Hawk	" 13	1	" 19		Nov. 5	Scarce		
Olive-backed Thrush	" 12	F				"	No	
Hermit Thrush	" 29	2	Oct. 20		Oct. 20	"		
Green-wing Teal	Oct. 4	F				"	No	
Redhead	" 4	2	Oct. 21		Oct. 21	"	"	
Am. Pipit	" 4	S			" 28	Fairly C	"	
Tree Sparrow	" 21	F. S	Oct. 23	Win. vis		C		
Canvas-back Duck	" 25	1				Rare	No	
Redpoll	" 28	F. S	Oct. 29	Win. vis		C		
Pigeon Hawk	" 30	1				Scarce	No	
Wilson's Snipe	Nov. 4	2				"	"	
Pine Grosbeak	" 5	F. S	Nov. 6	Nov. 5		C		Very common.
American Merganser	" 18	3				Scarce	No	
Snowflake	" 21	F. S	Nov. 25	Win. vis		C		
Northern Shrike	" 28	1		"				
Pine Siskin	Dec. 4	F		"				

PART V.

THE PROFESSOR OF CHEMISTRY.

To the President of the Ontario Agricultural College :

Sir,—I beg to submit herewith my Third Annual Report. The work of this department will be taken up under three headings : Teaching, Miscellaneous Work, including correspondence, addressing meetings, etc.; and Investigation Work. Under teaching, I refer particularly to the instruction given to students in attendance at the College. This I look upon as our most important work, and a very earnest effort has been made to make it as thorough as possible. The answering of letters of inquiry on practical points and the addressing of agricultural meetings is also important work, for it brings us into contact with the every-day difficulties experienced in farm work. Naturally these difficulties suggest lines of investigation that we would like to undertake ; but our time is so occupied by the work previously mentioned that it is practicaly impossible to undertake much research work. We have, therefore, sought to direct our energies more to the bringing out of practical results based on the scientific research of others.

As stated in last year's report, W. P. Gamble, B.S.A.,Lecturer in Chemistry, was given charge of the Dairy Chemistry work. During the last two years, he has analysed a large number of samples of mill by-products. His report on this and the teaching of Inorganic and Dairy Chemistry will be found in Part VI. of this volume.

Mr. W. C. Good, B.A., Demonstrator in Chemistry, resigned last September to return to his farm in Brant County. I was sorry to lose Mr. Good, as he rendered very efficient service while he was with us. Mr. E. G. de Coriolis, B.S.A., '03, who was appointed to fill the vacancy, commenced his new duties on the first of September.

Teaching.

It may not be out of place to give a brief outline of the work under this head. Instruction is given in the following branches of chemistry : Inorganic; Organic; Agricultural, including the chemistry of plant growth, soils and fertilizers ; Animal, including the chemistry of animal nutrition, foods and feeding; and Dairy chemistry, which comprises a chemical study of milk and its products. Qualitative and Quantitative analysis is also taught, and advanced work is done in the analysis of water, soils, fertilizers, foods, and dairy products.

These subjects are taken up in the following order : Three lecture periods per week throughout the whole of the first year are spent on Inorganic chemistry. During this time, both by lectures and by experiments performed by the students themselves in the laboratory, we seek to make plain the fundamental laws of chemistry and the properties of the more common elements. In the second year, about six weeks, with three lectures per week, are spent on Organic chemistry. The main object sought is to make the students familiar with the relation between starches, sugars, alcohols, acids, and etherial salts, and to show what fats, amides, etc., are. This is necessary for the proper understanding of the Agricultural and Animal chemistry, which takes up the remainder of the year. One afternoon each week is devoted to experiments planned to demonstrate the work taken in the lectures. This is the work in Chemistry for the Associate Diploma.

Students taking up the work of the third and fourth years with the intention of trying for the degree of Bachelor of the Science of Agriculture, are given further work

in Inorganic and Organic chemistry. I feel that a thorough knowledge of these subjects is essential to an understanding of the many intricate points which arise in the work of the farm and dairy. Consequently, the third year men are given three lectures per week in Inorganic chemistry until Christmas, with two afternoons of three hours each on the qualitative separation of the metals and acids. The remainder of the year is spent in Organic chemistry and quantitative analysis, leading into the analysis of fertilizers. In the fourth year, the methods employed in research work in Agricultural and Animal chemistry, the results obtained and their value in a practical way to the farmer, the stockman, and the fruit grower are discussed. Analyses of fertilizers, soils and fodders are also made, in order that the students may know something of the advantages and the limitations of such analyses. The specialists in Chemistry and Physics are given more difficult work in Organic and Inorganic chemistry and a wider training in the analyses of Agricultural products. Those taking the option in Dairying receive special training along their particular line.

In addition to this work in the College proper, a course of twelve lectures, with twelve half-days of laboratory instruction, was given in the Winter Term to the students of the Dairy School; and the Short Course men in Poultry received four lectures on foods. During the year, three men have been given special instruction, independent of the regular classes, in particular lines of work which they wished to take up.

In all the work of instruction, both in class-room and laboratory, we have always sought to keep the practical side prominent and to deal with the various subjects in such a way as to arouse the interest of the student in his work. I fully believe that if the boys can be led to inquire into the hidden meaning of the various farm operations we will hear less about the drudgery of farm work.

Miscellaneous Work.

After the teaching, perhaps the most important part of my work is attention to correspondence. It is gratifying to note that the general correspondence is increasing; for it indicates that the farmers have confidence in the College and are looking to us for information. During the last year, an increasing number of samples of a great variety of substances have been sent in for analysis. In some cases, the required information could be given without a full analysis; but, sometimes, only a complete analysis would give the information required, and then only if the sample has been accurately taken. Therefore, while I am anxious to comply with the request of all correspondents and give the fullest information possible, it has not always been thought wise to analyse all samples received.

Correspondence is sometimes of value in indicating the needs of investigation along certain lines. Recently a large number of inquiries were received regarding the food value of the various mill by-products of the Province. Seeing the need for some definite information on this subject, Mr. Gamble collected a large number of samples of these substances and analysed them, and now has the material ready for a bulletin dealing with the composition of these products.

During the last two years, but especially during the last year, a number of samples of swamp soils, rich in vegetable matter, have been sent in for examination. Most of these soils contain an abundance of plant food, and yet are unproductive. We, therefore intend making a fuller investigation of soils of this nature, and will be glad to receive samples of such soils, together with the fullest possible information regarding their previous treatment. At my request, Mr. de Coriolis, Demonstrator in Chemistry, has prepared the following short paper dealing with some of the most common needs of these swamp soils.

Investigation of the Composition of Soils Rich in Vegetable Matter.

With the breaking of land and the draining of swamps, many soils are put under cultivation which are rich in vegetable matter. Many such soils exist in Ontario, and

nothing has been done so far in the way of research along those lines. It has, therefore, been deemed necessary by this department to carry on some investigation as to the nature and composition of these soils.

So far, very few soils have been analysed, the reason for it being that the operation is rather long, and class work and other work leave very little time which can be devoted to analysis.

The proper way to carry on investigation on the above mentioned soils, to make the results practical and valuable, would be to find out their composition, the amount of available plant food they contain, and how farm crops, such as oats and barley, grow on them. This has been done with some soils. They were collected from the different fields and woods on the College farm, from places which were actually swampy or which but recently had been placed under cultivation. The results of the analyses go to show that they contain a sufficiently large amount of total plant food, and that in composition they compare favorably with the ordinary agricultural loam. The main points in which they differ from the loam are their richness in nitrogen (which is to be expected, owing to their formation from organic and nitrogenous matter), and their deficiency in potash. This last named constituent is one which needs most serious consideration. As is well known, the main natural source of potash in soil is from the rock particles which are found on most arable land and known as feldspars. By means of the various agents of erosion and weathering, the feldspar (Orthoclase), which is a double silicate of aluminium and potassium, breaks down, yielding soluble compounds of potassium. In drained swamps such rock particles are generally absent, and the supply of potash in the soil is naturally limited. Again, it seems that the amount of available potash is smaller in soils, rich in vegetable matter, than in ordinary clay loams, especially so, if the soil is not in a very good physical condition. In one of the soils analysed, this was most noticeable. The soil had been under cultivation for about fifteen years; but being in a low spot, it had never been effectually drained. Some of it was placed in a pot and sown with oats ; and the plants, after growing four inches, died; while side by side with them were plants growing vigorously in other soils, which by analysis had shown a larger percentage of available potash.

Another point to be noticed about soils rich in vegetable matter is that, although they contain a large amount of total nitrogen; that element is in an organic form and not as nitrates, the form of combination which is most available to plants. The apparent reason for this is that such soils owe their formation mostly to decayed vegetable matter which accumulates in swamps where nitrification, the process by which organic nitrogen is converted into nitrates, is practically at a standstill. There is even a reverse process known as denitrification, which is supposed to be active in breaking up nitrates and liberating ammonia. Both these processes are brought about by the activity of certain living organisms known as nitrifying and denitrifying germs. When a swamp is drained and placed under cultivation, the germs that are most active are the denitrifying germs. In fact, the nitrifying germs are very often absent. A soil in such condition may be given the best treatment possible, without any satisfactory returns. Before it will produce crops, it must be inoculated with nitrifying germs. On a small scale, this may be done by adding some garden loam to the soil, the garden loam being known to be fairly rich in nitrifying germs.

To test the above mentioned facts, an experiment was conducted this summer on the soil analysed last year, which showed a great lack of available potash. Some of the soil was taken and distributed in three large-sized flower pots and sown with oats. To pot No. 3, a handful of garden loam was added ; in pot No. 2, some muriate of potash was sown with the oats; and nothing was added to pot No. 1.

The accompanying photographs prove pretty conclusively that what was lacking in the soil was not so much the potash as the nitrifying germs. The growth in pot No. 3, in which the soil was innoculated, greatly surpassed that in No. 2, to which potash

was added; and the stunted growth in No. 1 shows clearly the beneficial effect which the plants in No. 3 obtained from the nitrifying germs.

Another point to be noticed about soils rich in vegetable matter is that during the decomposition of the organic matter large quantities of various acids are formed. These must find in the soils bases with which to combine, or else the excess of unneutralized acid present will become injurious, arresting the important function of nitrifying germs.

Pot experiments with soil rich in vegetable matter.

Pot. 1. Soil alone. Pot. 2. Soil and muriate of potash. Pot 3. Soil and garden loam.

The most common base with which these acids combine is lime; and it has been found that soils containing a large amount of free acid are generally lacking in that constituent.

What has been said above about soils rich in vegetable matter is based on deductions from the results of a few analyses. Some facts regarding the nature and composition of soils rich in vegetable matter have been noticed; but, before drawing any definite conclusions, we must wait until further experiments have been made, with a view to throwing additional light on the subject.

E. G. De Coriolis.

Last winter the Dominion Master Bakers' Association, with the consent of the Minister of Agriculture, organized a Bakers' School, the first session of which was held in Toronto last April. It was only a two days' session; but the attendance of both master and journeymen bakers from different parts of the Province was good. At this school I delivered two lectures on questions relating to the Chemistry of Flour and Breadmaking. I also gave a lecture on the Chemistry of Flour at a joint meeting of the Dominion Master Bakers' Association and the Dominion Millers' Association held in Toronto in September. In addition to this, for the last three years I have addressed the ladies of the Ontario Normal School of Domestic Science and Art, Hamilton, on "Flour." In the past, I have done some chemical work on Ontario wheats and flours, part of which has been published; but, in view of the fact that millers and bakers are becoming more interested in the scientific side of their work, and are looking to us for assistance, and also to the fact that, through the generosity of Sir William Macdonald, of Montreal, a School of Domestic Science has been established at the College, I felt the need of doing more work along these lines and of studying the methods of investigation followed elsewhere. Consequently I applied, through you, to the Minister of Agriculture, for permission to go to Minneapolis, Minnesota, to see something of the work done in testing wheat and flour in the large flour mills there. My request was granted, and in August I spent sometime in the laboratories of the Northwestern Consolidated Milling Company and the Pillsbury Milling Company, Minneapolis. I also spent a day with Mr. Howard, who tests flour for the smaller milling companies that have not laboratories of their own.

While in his laboratory, I had the pleasure of seeing the first test of flour made from wheat grown in Manitoba in 1903. In all these laboratories, the principal tests are for color and strength of flour and quality of the bread it will produce. The quantity and quality of glutens are determined; but the main dependence is placed on the baking test. In the larger mills, these baking tests are made daily, and the bread is compared with that got from a standard flour. In this way, they seeek to keep their various grades of flour up to standard. At the Minnesota Experiment Station, I met Prof. H. Snyder, who has possibly done more work on the chemical side of wheat and flour in its relation to breadmaking than any other man in America. From him I got some information that will be of value in our work here.

At the request of the Referee on "Food Analysis" of the Official Agricultural Chemists' Association, we co-operated in the study of new methods for the analysis of flour. A report of our results was duly forwarded to the Referee, and it was incorporated in his report to the Association. As Referee on "Vegetable Proteids" for the same Association, I found, owing to the vagueness of the literature on the subject, and to the difficult nature of the separations of the various classes of proteids, that I could do nothing more than read up the literature on the subject, and report the present state of knowledge of these complicated compounds, or, as is commonly said, "report progress." It is well known that all proteids have not equal food value. Our old methods of analysis do not provide for the separation of these bodies. Therefore, if we wish to gain a fuller knowledge of the feeding value of the common cattle foods, especially those fed in an immature state, it is important that means be devised for making their determination. Hence the value of this work.

I have been asked to act as Referee on Vegetable Proteids for another year; but, important as this work undoubtedly is, I feel that it would occupy more of my time than I can afford to give to it, and consequently I have declined to act.

Investigation Work.

Wheat and Flour. The wheat grown in Manitoba and the Northwest Territories in the season of 1902 was a good sample and weighed well; but the millers were unable to make a strong flour from it. The bakers claimed that the flour was weak and would not stand the proper amount of fermentation; and yet it seemed to contain a fair amount of gluten. Complaints were so general that we were asked to examine the flour, and, if possible, find out what was wrong with it. The analysis showed that the gluten was poor in quality. The gluten of flour is made up of two nitrogenous bodies, gliadin and glutenin. The gliadin, or plant glue, as it is sometimes called, is the substance which gives tenacity to the dough. It is due to the elasticity of this gliadin that the gases produced during fermentation are retained in the dough and the dough is said to "rise." If the amount of gliadin is low, the gases break through and escape and the dough does not rise properly. The "Patent" grades of flour always contain more gliadin than the lower grades, made from the same wheat, and, consequently, are stronger flours, and the dough rises better. On examining the flours made from wheat grown in the West in 1902, we found that they were all very low in gliadin. The following results show the difference in this respect between flours from wheat grown in 1901 and 1902:

Percentage of Total and Gliadin Nitrogen in Flour.

1901.	Total Nitrogen.	Gliadin Nitrogen.	Per cent. of total Nitrogen in Gliadin form.
Manitoba "Patent"	2 05	1.39	67 3
" "Bakers"	2 12	1.33	62 7
Ontario "Patent"	2.07	1.31	63.3
1902.			
Ontario "Patent	2.25	1.09	48.5

These figures show that the amount of gliadin in the wheat grown in 1902 was much lower than in the wheat of 1901. Some of the soft varieties of wheat contain too much gliadin to make gluten of the best quality. Consequently, the mixing of the flour from wheat grown in the west in 1902 with some of the softer varieties of Ontario should give better results. This was recommended at the time. The wheat grown in 1903, while not so fine a looking sample as that of 1902, contained more gliadin, and the flour was satisfactory to the baker.

During the year we have made determinations of the quality and quantity of gluten contained in wheat cut at three different stages of maturity, that is, just before it was ripe, when it was ripe, and when it was over-ripe. This work was done with two varieties of wheat, and indicates that there is considerable falling off in quantity of gluten when the wheat becomes over-ripe. We wish to repeat the work on other varieties before publishing the figures obtained.

Some other work in connection with the study of the quality of wheat has been undertaken, and considerable time has been spent on it; but the work is not far enough advanced to report at present.

Soils and Fertilizers.

The following experiment with fertilizers was undertaken to illustrate a practical method of determining whether a given soil is deficient in any of the important constituents of plant food. Too often farmers and others in writing for information regarding soils, fancy that we can, after making an analysis, tell them exactly what is lacking and how that particular soil should be manured to produce the best results. Unfortunately the analysis of a soil is a long and tedious process, and the methods of analysis have not been so perfected as to give all the information desired. Other circumstances, such as the accuracy of the sample, availability of the plant food, the condition of the soil regarding cultivation, drainage, etc., have an important bearing on the subject. Soil analyses have their place, and are of value; but in many cases it is much more simple and more practical to let the soil speak for itself.

The soil used in this experiment was a clay loam on which two or three grain crops had been grown in succession. Seven boxes, three feet long by eighteen inches broad and nine inches deep, were filled with the soil and sown with oats. Fertilizers were then applied as follows:

Box No. 1. Nitrate of Soda.
Box No. 2. Muriate of Potash.
Box No. 3. Superphosphate.
Box No. 4. Nitrate of Soda and Superphosphate.
Box No. 5. Nitrate of Soda and Muriate of Potash.
Box No. 6. Muriate of Potash and Superphosphate.
Box No. 7. Mixture of the three.

Plots showing the effect of different fertilizers.

From the illustration, it is evident that the oats grew best in boxes Nos. 4 and 7; but no better in No. 7 than in No. 4. The addition of superphosphate and nitrate of

soda gave as good results as the mixture of all three constituents. Thus, apparently, the oats were able to obtain all the potash they required, and the addition of that substance did not affect the results. Thus, potash would be applied at a loss on this particular soil for the oat crop. Again, it is evident that it required both superphosphate and nitrate of soda to increase the growth. This illustrates the point that plants require their food supplied in a balanced ration. The addition of one constituent to a soil does not make up for its deficiency in another ; but the growth is limited by the supply of the constituent present in the smallest quantity. Therefore, if there is just nitrogen enough in the soil for half a crop and an abundance of the ash constituent, there will be only half a crop, and it can be increased as more nitrogen is added, without increasing the ash constituents.

In actual practice is is well to apply the fertilizers to, say, one-tenth acre plots in the field ; but the plan given above illustrates the principle. By such experiments as these, the farmer can find out for himself better than any one can tell him the needs of his soil. It must be remembered, however, that the various farm crops differ widely in their requirements of plant food, also that the various soils show different needs, and that the same kind of soil may respond differently with the season and treatment. Consequently, every farmer who wishes to keep in touch with the needs of his land should make himself familiar with the food requirements of his crops and study the soil from year to year with some such experiments as outlined. This applies especially to those farmers who are beginning to use artificial fertilizers, for it is impossible to apply these substances intelligently and economically without first knowing what the crop requires in the way of plant food and what the soil is most deficient in.

Insecticides.

The use of insecticides and fungicides has become almost indispensable to the farmers and fruit growers of this country. As a result, an ever-increasing number of these substances are placed upon the market. Some of these are said to kill bugs, destroy fungous diseases, stimulate plant growth, etc., etc. Without a doubt, some of them do meet the claims of the manufacturers ; but there are others which are not of sufficiently high standard to warrant their use, and for this reason commerce in them should be discouraged. In reporting the work done on insecticides, we have no intention of interfering with a legitimate business; but it seems only proper that the retail merchants and the men who use these insecticides should be acquainted with their real characters. The insecticides we have analysed and hereafter reported on are those commonly used on the potato vines.

Paris Green contains as its chief constituent a compound called copper aceto-arsenite. All the arsenic contained in Paris Green is supposed to be held in this compound, and in this form will not destroy foliage. Now, Paris Green, as found in the market, rarely consists of pure copper aceto-arsenite, but contains this compound as its chief constituent, with varying proportions of other substances. Lack of care in the manufacture of Paris Green, and the use of impure compounds, may be sufficient reason for the presence of some free arsenious oxide, gypsum, clay, etc., etc., but this can hardly be said to account for the large quantities of these substances found in some samples. In Bulletin No. 88, Inland Revenue Department, Ottawa, Thomas Macfarlane, Chief Analyst, reports that out of 169 samples of Paris Green analysed in 1902 and 1903 only 7, or 4.2 per cent. were adulterated. On the other hand, last winter one of our students, Mr. J. P. Cleal, collected and examined 23 samples, only 5 of which could be said to be unadulterated. Mr. Macfarlane's samples were collected in the larger cities of the Dominion ; Mr. Cleal's were got almost entirely from country stores, many of them from unsealed packages. In one case, three samples traced to the same source were differently adulterated. The amount of free arsenious acid in Mr. Cleal's samples varied from .9 to .9 per cent., five of them having over 4 per cent. It is the arsenic in this form that burns

the leaf. The quantity of the various substances used to adulterate the Paris Green was not determined; but, in some cases, it was very large.

A good practical method for ascertaining the purity of Paris Green is to test its solubility in ammonia water. A small portion of the sample to be tested should be placed in a glass dish, a tumbler or goblet will do, and strong ammonia water added. The Paris Green will all dissolve readily, leaving a deep blue solution. Sufficient ammonia water must be added to dissolve all the Paris Green. Any gypsum or clay used to adulterate the sample will settle to the bottom quickly and can be readily seen.

Lime is commonly used with the Paris Green to neutralize the free arsenious acid and prevent scorching of the leaves. Very often, however, the lime is simply mixed with the Paris Green in water and applied at once. A better practice is to allow the two to stand in contact with one another for a little while before applying, in order to give the lime time to combine with the arsenious acid.

Black Death.

One of the newer insecticides recently offered for sale in this Province is "Black Death." It is sold at 2 cents per pound, or 15 pounds for 25 cents. The composition of this substance according to our own analysis is as follows:

Moisture	10.42	Carbon dioxide	7.90
Sand, etc.	6.37	*Paris green	0.43
Carbon	17.39	Undetermined (volatile matter, water of crystallization)	8.31
Sulphur trioxide	23.72		
Calcium oxide	23.30		
Magnesium oxide	2.16		100.00

*Copper oxide, .13 per cent.; Arsenic trioxide, .12 per cent.

This insecticide is composed almost entirely of charcoal, sand, and gypsum. The only substance present which will poison insects is the Paris Green. If mixtures with so small an amount of this poison will kill insects, it will be cheaper to buy a pound of Paris Green and mix it with 200 pounds of gypsum. Paris Green can be bought for 20 cents per pound. In Black Death it costs $3.86 per pound.

Potato Bug Finish.

"Bug Finish" is another insecticide that is now on sale in various localities. It is sold at the same price as "Black Death." The following is the composition of the sample analysed:

Moisture	12.49	*Paris green	1.06
Sand, etc.	17.57	Iron and aluminium oxides	1.13
Insoluble organic matter	0.69	Undetermined (water of crystallization, volatile matter, etc.)	3.54
Sulphur trioxide	30.47		
Calcium oxide	25.79		
Carbon dioxide	5.77		100.00
Magnesium oxide	1.49		

*Copper oxide, .32 per cent.; Arsenious oxide, .70 per cent.

One hundred pounds of this mixture contains only a little over one pound of Paris Green: the remainder is largely sand and gypsum. The Paris Green in it costs $1.56 per pound.

Kno Bug.

The manufacturers of this insecticide claim that it kills the bugs, stimulates the plant, and improves the quality of the crop. It sells in 20-pound boxes at 6 cents per pound. According to our analysis, it has the following composition:

Moisture	10.89	Iron and aluminium oxides	4.03
Insoluble matter	10.55	Potash, Nitrogen—Potassium nitrate	4.50
Sulphur trioxide	26.10	*Paris green	2.49
Calcium oxide	26.73		
Carbon dioxide	11.95		100.00
Magnesium oxide	3.09		

*Arsenious oxide, 1.46 per cent.

It is essentially crude gypsum with 2½ per cent. of Paris Green, and potash and nitrogen equivalent to about 4.5 per cent. of potassium nitrate. The latter is a valuable plant food; but, as there is only about 25 cents' worth in 100 pounds of the mixture, it does not add very much to its cost. Anyway, it would appear to be a better practice to keep insecticides and fertilizers separate. Without allowing any value for the other materials, the Paris green in this mixture would cost $2.41 per pound.

Slug Shot.

Slug Shot is essentially crude gypsum mixed with small quantities of Paris Green, tobacco, and carbolic acid. It is sold in Guelph at 10 cents per pound, or 3 pounds for 25 cents. In larger quantities it can be bought for much less. The detailed results of our analysis are as follows :

Moisture	13.55	Carbon dioxide	2.79
Sand, etc.	3.53	*Paris green	2.13
Insoluble matter (sulphur, tobacco, etc.)	5.69	Phenol, soluble organic matter, etc. (by difference)	3.38
Calcium oxide	30.10		
Sulphur trioxide	37.93		100.00
Iron and aluminium oxides	0.80		

*Copper oxide, .64 per cent.; arsenic trioxide, .82 per cent.

Carbolic acid is a poison, and as such will, no doubt, destroy bugs as well as the Paris Green; but this mixture at even 5 cents per pound is rather an expensive substance to use in destroying potato bugs.

Bug Death.

Another insecticide that has recently come into great prominence is Bug Death. It is claimed that it kills the bugs, feeds the plant, increases the yield, and improves the quality. It is sold at the rate of 12 pounds for $1, or 100 pounds for $7. The following is the composition of samples secured in 1902 and 1903 :

	1902.	1903.		1902	1903
Moisture	0.32	0.38	Zinc oxide	87.47	83.04
Volatile matter	2.67	2.87	Iron oxide	3.84	4.09
Sand, etc.	3.17	4.26			
Lead oxide	3.17	4.70	Total	100.64	99.34

It is composed largely of crude zinc oxide with small quantities of lead oxide and iron oxide. It also contains nitrogen equivalent to about one-half of one per cent. of ammonium sulphate. This latter substance is a plant food ; but there is so little of it in the mixture that it cannot have much value. Bug Death has considerable fungicidal value, and also destroys the bugs. It has to be applied in fairly large quantities and is rather an expensive substance ; but it has given good results when used on potatoes.

Tests of Different Varieties of Sugar Beets.

At the request of Mr. Zavitz, Experimentalist, we have determined the percentage of sugar in a number of varieties of sugar beets grown on the experimental plots at the College. These beets were grown on the level in rows, 21 inches apart, and thinned so as to leave the plants 8 inches apart in the row. The object of the experiment was to determine the yield and feeding value in so far as they may be judged from the sugar content of the various varieties. The results obtained are also of value, in that it is possible to compare some of the best varieties for sugar factory purposes with the Kleinwanzlebener, which is now looked upon as the standard variety for that purpose in this Province. The following table gives the percentage of sugar in the juice and the purity of the solid of the juice :

Percentage of Sugar in Juice of Beets Grown on Experimental Plots in 1901, 1902 and 1903.

Name of varieties.	1901.		1902.		1903.	
	Sugar.	Purity.	Sugar.	Purity.	Sugar.	Purity.
Red Top	10.9	81.5	10.2	81.0	12 2	87.7
Red Skinned	9.6	78 4	13.8	85.2	16.0	86 0
White Silesian	14.5	86 9	12.5	75 6	16.2	88.5
New Danish	11 4	81.6	11.4	84.1	10.7	80.4
Green Top White	13 6	83 2	13.0	84.9	14 1	85.4
Lane's Improved	11.6	80.9	12.2	84.2	13.7	83.0
Champion	9.6	74 2	16 3	90.0	19 0	90.0
Reyal Giant	10.4	83.3	9.5	83 3	11.1	83 9
Giant Red, half sugar	9.6	85 0	10.2	82.3	11.4	80.8
White French	14 4	83.5	9.5	80 5	11.3	84 7
Giant White, half sugar	9.0	74 7	10.1	81.5	9 1	75.2
Pitzseheke's Elite	15 8	82 6	14.6	88 9	17.9	88.6
Jersey	15.6	88.7	12.8	87 7	11.5	83.2
French Yellow	13 3	85 2	13 0	86.9	12 9	80 1
Carter's Nursery	16.1	87.6	10 0	80.9	10.5	80.7
Improved Imperial	16.3	86.4	15 6	90.8	17 9	90.2
Improved Grey Top	14.9	85.7	15 3	88.0	15.7	85.7
Queen of the Danes	13.3	84.8	10.3	81 5	11.1	80 0
Vilmorin's Improved	16 8	88 9	14.4	84 8	15.4	89.1
" French Sugar	14.0	83 6	16 5	90.3	16 3	86.3
Kleinwanzlebener	17.5	89.8	16.3	90.0	17.4	88.3
Mangel Sugar Beet	.....	.....	15.6	87.1	18.3	87.5
Tancred Cream	.....	.....	9 5	80 0	9.3	77.5
Jarnsahic Victrix	.....	.....	16.1	89 5	17.5	87 5
Ideal	.....	.....	7.1	70 6	7.7	70.0
Diechman No. 1	.....	.....	16.1	87 0	17 4	86.1
" No. 2	.....	.....	16 1	88 5	18.1	90.5
" No. 3	.....	.....	16 3	88 5	17.5	89.2
Rubensamen	.....	.....	16.7	88.3	18.2	91.0
C. Vorstadt	.....	.....	16.7	89.1	.....	.....
Hybrid Sugar Beet Mangel	.....	.....	.....	.....	11.1	80.1
Imperial Giant, half sugar	.....	.....	.....	.....	11.3	79.0
Rennie's Giant Sugar	.....	.....	.....	.....	10.9	79.5

The yields obtained with these different varieties will be found in the Report of the Experimentalist, Part XIII. of this volume.

It will be noticed that the larger growing varieties, such as the New Danish, Giant Red, and Giant White, are low in sugar, while the White Silesian and Jersey, much smaller growing varieties, are high in sugar. The indications are that, generally speaking, the larger varieties are not equal to the smaller ones in food value. Looking now to the quality of beets required for sugar factory purposes, we notice that in 1901 no variety was grown which was equal in sugar and purity to the Kleinwanzlebener. In 1902, there were two equal and three slightly better; while in 1903, there as one equal and seven better than this famous German variety.

Test of Quality of Sugar Beets as Affected by the Distance Between the Rows.

In this experiment, as in the last, the beets were grown by the Experimental Department. The seed was sown on the level in rows 12, 14, 16, 18, 20, 22, 24, 26, and 28 inches apart, and, in all cases, thinned so as to leave eight inches between the plants in the rows. This experiment was first carried out in 1902 and was repeated this year. In both years duplicate plots were grown. The results so far as yields are concerned, will be found in the Report of the Experimentalist, Part XIII. of this volume. The effect on the quality, determined at two different dates, 16 days apart, may be seen in the following table:

Composition of the Juice of Sugar Beets Grown in Rows Different Distances Apart.

Distance apart of rows.	Date of lifting.	1902. Average wt. of tared beets.	1902. Analysis of juice. Solids.	Sugar.	Purity.	1903. Average wt. of tared beets.	1903. Analysis of juice. Solids.	Sugar.	Purity.
		ozs.				ozs.			
12 inches	October 3	9 0	16.8	15.0	89.5	8.0	18 9	16.7	88.2
12 "	" 19	9.6	18.5	15.9	85.8	12.2	20 4	17.6	86.5
14 "	" 3	11 1	16.8	14 4	85 5	8.8	18 9	16.5	87.3
14 "	" 19	11.7	18.7	16.2	86.9	12.2	19.6	17.6	90 0
16 "	" 3	13.3	16 6	14 2	85 5	9.4	19.5	16.4	83.9
16 "	" 19	15 3	18.6	16.5	88.7	13 3	20.2	17.8	88.1
18 "	" 3	12.7	16.8	15.0	89.0	10.9	18.7	16.4	87.9
18 "	" 19	12 3	18.3	16.4	89.2	13 7	19 4	17.0	87.3
20 "	" 3	13.2	17.3	15.4	88.6	11.5	18 5	16.3	87.8
20 "	" 19	13.6	18.5	16.4	88.6	13.6	19 5	17 7	91.3
22 "	" 3	13 3	16.7	14.7	88 1	13.8	18 6	16 4	87.9
22 "	" 19	15.3	17.9	15 4	85 8	16.8	19.7	17 2	87.6
24 "	" 3	16 0	16.9	14.4	84.8	15 6	18.4	16.2	88.0
24 "	" 19	16.2	18 1	15.6	87 0	15 3	19.5	17 1	87.4
26 "	" 3	16 7	16.6	14.2	85.2	15.7	18.6	15.9	85.4
26 "	" 19	16 0	18.3	16.2	88.7	14 9	19.7	16 8	85.2
28 "	" 3	14.2	16.8	14.5	86.4	16.2	18.3	15.7	85.7
28 "	" 19	14.5	18.5	16.1	87.2	15 4	20.2	17.4	86.2

This year, there was very little rain through the latter part of September and early part of October, and last year the weather during the same period was uniformly wet, so that we have results from two different types of seasons. In all cases, the beets of one lifting were taken up without any rain, or other known circumstances, affecting the quality. In both years the beets taken at the earlier date were not as mature as those lifted later; but it cannot be said that the beets in rows closer together were any more mature than those in the rows a greater distance apart, nor did they mature more rapidly during the sixteen days between the two liftings. On the other hand, it is quite noticeable that in both experiments the average weight of the beets, tared as required for the factory, increased in weight with the wider distance between the rows. These experiments indicate that there is practically no difference in the quality of beets grown in rows 18 or 20 inches apart and thinned to eight inches in the row; but that there is a decided increase in the size of the beets as the distance between the rows is increased. Reference to the Report of the Experimentalists, however, shows that heavier yields are got the closer the rows are together. According to these results, it is apparent that the number of tons of beets that can be grown on an acre of land decreases as the distance between the rows is increased. In actual practice, the cost of cultivation of beets in rows 12 inches apart is greater than when there is a space of 28 inches between the rows. Just how far apart the rows shall be placed is, therefore, a question between cost of cultivation and yield of beets. With the cultivators now in use it is possible to conveniently cultivate between rows 18 inches apart, and this is the spacing usually recommended by those interested in the production of sugar beets for factory purposes.

Effect of Fertilizers on Sugar Beets.

Last year five quarter-acre plots of sugar beets were divided into two equal portions and one-half fertilized with Thomas Phosphate and the other half left unfertilized. The fertilized portion yielded over one ton of beets more per acre than the unfertilized, but there was practically no difference in the quality of the beets. This year Mr. Fulmer, one of our fourth year students, as part of the work on his graduation thesis, determined the effect of nitrogenous, potassic, and phosphatic manures and various mixtures of these manures on the quality and yield of sugar beets. The land used for this experimental

work was a clay loam and formed part of the field prepared in the usual way for turnips. It was in good condition, although no manure had been applied to this portion of the field for four years. Each plot was two rods long by one rod wide. The land was uniform and the stand of plants secured was almost perfect. The following table shows the fertilizers, the way they were combined, and the quantity of each used on the various plots. It also gives the results of the analysis of the juice and the yield per acre obtained when the beets were lifted on the 20th of October :

Composition of Sugar Beets.

No. of plot.	Manures.	Pounds per acre.	Analysis of juice.			Yield per acre.	
			Solids.	Sugar.	Purity.		
						Tons.	Lbs.
1	Farmyard manure	40,000	19.26	15.70	81.5	18	606
2	Mixture—						
	Sodium nitrate	80					
	Muriate of potash	120	20.06	17.15	85.4	16	399
	Superphosphate	320					
3	Sodium nitrate	240	19.46	17.05	87.5	17	273
4	Superphosphate	360	18.84	16.10	85.4	16	238
5	Muriate of potash	160	18.62	15.75	84.5	18	168
6	Mixture—						
	Sodium nitrate	160	20.02	17.45	87.1	18	763
	Muriate of potash	160					
7	Mixture—						
	Muriate of potash	160	19.82	17.25	87.0	19	156
	Superphosphate	320					
8	Mixture—						
	Sodium nitrate	160	19.22	16.90	87.9	16	584
	Superphosphate	320					
9	No manure or fertilizer	.....	20.12	17.55	87.2	15	346
10	Lime	2,400	18.82	15.75	83.6	17	229

The figures given above are the results of only one carefully-conducted experiment on one type of soil, and, therefore, cannot be supposed to apply to all kinds of soils. It is generally considered that farmyard manure has a tendency to force growth late in the season, and thus retard the ripening process. Reference to plots Nos. 1 and 9 shows that this contention is borne out in the experiment. The application of farmyard manure increased the yield by three tons per acre, but the percentage of the sugar and the purity of the juice are the lowest in the test. The plant food in the farmyard manure is rendered available comparatively slowly throughout the season. If the early part of the season be dry, and rains come in August and September, the conditions are at their worst, for then the farmyard manure and the moisture together tend to force growth at a time when the plants should be maturing. Nitrogenous manures force leaf and stem growth ; but, in plot No. 3, where sodium nitrate was applied, the beets were evidently well matured. In this case the nitrogen was available in the early part of the season, and the more rapid growth took place then. In this experiment, the application of muriate of potash increased the yield more than any other single fertilizer, in fact, almost as much as the farmyard manure. There was a greater increase when sodium nitrate was applied along with the potash, and a still greater increase when the two ash constituents, phosphoric acid and potash, were applied together ; but, when potash was left out of the mixture, the yield dropped considerably. It is evident, however, that potash alone does not tend to produce beets of high quality. As one of the actions of lime is to liberate potash in the soil, it is not surprising that the results obtained from its use correspond somewhat closely with those where potash was applied alone.

When sugar beets are grown on poor soil, the yield is usually low and the percentage of sugar high. When farmyard manure is applied in the spring, the ten-

dency is to increase the yield and decrease the sugar content. To obtain large yields of beets of good quality, it is essential that the land be rich ; but the farmyard manure should be applied with the previous crop. Wood ashes contain potash and phosphoric acid, and may be applied in the spring with good results.

Sugar Beet Pulp.

The pulp and waste molasses are the two main by-products of sugar factories. The former is the sliced beets, or "cossettes," after the sugar has been extracted ; the latter is the portion of the sugar extract left after the crystallizable sugar has been removed. The pulp is usually either flushed out of the factory with water or is passed through a strong screw press, where the water content is reduced to about 90 per cent. In this form it is a valuable cattle food, very similar in composition and food value to turnips. In the Berlin district particularly, the value of pulp as a cattle food is fully appreciated, and thousands of loads of it has been taken away by the farmers this season. One drawback to the value of pressed pulp is that it contains so much water that it cannot be transported long distances profitably. The difficulty has been recently overcome by drying the pulp at the factory. The first one of these drying plants operated in Ontario, and, I think, the second on the continent, was built by the Dresden Sugar Co., Dresden. All the pulp from the factory is passed through two powerful screw presses and then into the dryer, where the moisture is reduced to from 2 to 5 per cent. In this form it is bagged and stored away ready for shipment. They have also mixed the waste molasses with the pulp and dried the two together, making what they call "Molasses Cattle Food." The composition of dried pulp, and dried pulp and molasses, as determined in samples received from the factory this fall is as follows: as determined in samples received from the factory this fall is as follows :

Composition of Dried Pulp.

	Dried pulp.	Molasses cattle food.
Moisture	3.17	2.70
Ether extract	.73	1.46
Crude protein	7.69	8 81
Crude fibre	20.67	14.11
Soluble carbohydrates	61.71	66.58
Ash	6 03	6.34

The molasses had evidently improved the food value of the pulp. In the pressed form and in this new dried condition, sugar beet pulp is a valuable addition to the cattle foods of the Province. In order that we may have a fuller knowledge of the pulp, we will determine its digestibility this winter.

Sugar Beet Industry.

The past season has been a favorable one for sugar beet growers. It is true that in some localities the dry weather in the spring retarded germination and operated against the securing of a full stand of plants, but there was good growth during the summer, and the comparatively dry weather of the autumn allowed the beets to mature well, and rendered the work of harvesting more pleasant and less expensive than it was last year. The percentage of sugar in the beets sliced at the factories this fall will average over 15, while many carload lots have tested over 17. The purity of the juice, especially during the early part of the season, was very high. The only drawback to the full success of the factories this season was the scarcity of beets. The excessive amount of rain in 1902 and the extra labor this entailed in combating weeds on unprepared ground followed, as it was, by a wet, disagreeable fall, made many farmers unwilling to increase their acreage this year. The Ontario Sugar Co. will possibly have about two-thirds, and the Wallaceburg about one-half of a full campaign. The Wiarton and Dresden factories were particularly unfortunate in securing acreage, and, con-

sequently, had a very short campaign. However, the factories were able to commence slicing earlier, and have been in better running order this year. The beets being of better quality have also tended to improve matters for them. The Peterboro' Sugar Co., of Peterboro', commenced building operations rather late last spring, and when they found that the factory could not be completed this fall, sold the beets which they had under contract to the Wallaceburg Sugar Co. The experiment we conducted in the Peterboro' district in 1901 proved that sugar beets of very high quality could be grown there. This year's results confirm this conclusion, for the first 22 carloads shipped to Wallaceburg averaged 16.1 per cent. of sugar in the beets. The average for the whole season was 16.5 per cent.; 25 carloads went over 17, several reaching 17.8 per cent.

Regarding the question of whether farmers will continue to grow beets for the factories, I can only say that most of those who grew beets this year are exceedingly well pleased with the results. According to the terms imposed by the Provincial Government when the bonus was granted, the sugar companies were to pay a flat rate of $4 per ton for the first year, and $4 per ton for beets containing 12 per cent. of sugar, with 33 1-3 cents for each per cent. over 12 the second year. Thus, a farmer delivering beets containing 15 per cent. of sugar received $5 per ton. As this is the second year of the bonus, and 15 per cent. was the approximate average sugar content, it follows that the growers received this year about $5 per ton for their beets. In some instances beets were received at the factories rich enough in sugar to warrant the payment of nearly $6 per ton. With the practical knowledge gained from year to year in methods of preparing the ground, cultivating and harvesting the crop, and with the introduction of improved labor-saving machinery, it does seem as though the sugar beet is going to be one of the most profitable crops of the farm. The better methods of cultivation which are being introduced with this industry will also have a very beneficial influence on agriculture in general.

Uncompleted Work.

Besides the uncompleted work mentioned in the early part of this report, we are engaged on a study of the composition and digestibility of freshly-cut corn, as compared with that of corn cured in the field and in the silo. The corn crop of three different years has been studied, and the digestibility determined with sheep and cattle. This work is nearly completed, and the results will shortly be ready for publication.

Need of Increased Accommodation.

I desire to call your attention to the fact that the laboratories in the chemical building are altogether too small for the purposes for which they are required. In some classes two men work in the space originally intended for one, and in all the classes the men are too much crowded to do thoughtful work. I have had to let the specialists in chemistry and dairying work in the station laboratory, thus hampering our own analytical work. In view of these circumstances, and of the probability that the students of the Macdonald Institute will take chemistry with us, I beg to suggest that some addition be made to the chemical building this coming summer.

Publications.

The principal publications prepared this year were "The Report of the Sugar Beet Experiments in Ontario, 1902," pp. 32, and Bulletin 131, "Ripening of Cheese in Cold Storage," pp. 16. The first was prepared by myself, and the second by Prof. Dean and myself.

Respectfully submitted,

R. HARCOURT,
Professor of Chemistry.

December 31st, 1903.

PART VI.

THE LECTURER IN CHEMISTRY.

To the President of the Ontario Agricultural College :

Sir,—I beg to submit herewith a brief report of my work for the year ending December 31st, 1903:

Teaching.

During six months of this year my attention has been entirely concentrated on teaching. The ground covered was practically the same as that outlined in last year's report. It is, therefore, unnecessary to take up valuable space with a review of this work. I would like, however, to emphasize the importance of the lectures and laboratory work. As is well known, many of our young men come to the College with but a very elementary public school training. To such students the subject of Chemistry at first appears to be incomprehensible. Gradually, however, as the fundamental laws underlying the science are unfolded, the close relationship between it and practical agriculture is realized, and the student appreciates very greatly the value of even an elementary knowledge of the subject.

In teaching this subject, I have always found myself handicapped by insufficient equipment in the way of apparatus. It is necessary for the student to have a course of laboratory work to supplement the lectures. We hope, therefore, that a more liberal grant may be forthcoming, in order that this important branch of a scientific agricultural education may attain the highest degree of perfection.

The work of the dairy class is an important part of the teaching. In this, as in all our instruction, the practical side is emphasized. It is, perhaps, impossible to point to any specific number of cases where the good that a training in elementary chemistry for dairymen can be accurately measured. Yet, we are confident from the keen interest exhibited by the members of our dairy classes that the instruction given has not been lacking in good results.

The conduct of the student body in the class room has been excellent, and I am proud to say that the eager interest of our students in their studies has been a great source of satisfaction as well as a great incentive to me.

Investigations Undertaken.

Composition of By-products of Flour, Oat, Pea, and Starch Mills. The animal body is made up mainly of four classes of substances—water, ash or mineral matter, nitrogenous matter, and fat. The proportion in which these four classes of substances occur depends upon the age of the animal, its treatment, the purpose for which it is kept, etc. The substances of the body are continually breaking down and being consumed. To keep the animal in a healthy condition, there must be a constant supply of new material. If this is lacking or insufficient, hunger and finally death result. To keep up this supply is one of the chief uses of food, but in addition to this, the food supplies the heat of the body, and at the same time furnishes energy, which enables the animal to move the muscles and do work, both external and internal.

In addition to the above mentioned functions of foods, they also supply the immature animal with material wherewith to build up the tissues of the body. It will, therefore, be seen that to supply food in the right proportion to meet the requirements of the animal, without a waste of food nutrients, constitutes scientific feeding, and it is

by carefully studying the composition of feeding stuffs and the requirements of animals that a great deal of information may be obtained which would be of inestimable value to the practical agriculturist.

It was for the purpose of determining the composition of different by-products, and also determining the digestibility of the different foods that the work herein described was undertaken. We have been unable to secure the proper equipment, for carrying out this last mentioned part of the work, but we are in hopes that in the near future arrangements will be made whereby this very important line of research may be successfully carried on.

Throughout our Province are scattered a large number of mills which manufacture products such as bran, gluten meal, oat hulls, pea bran, etc. These products find thier market largely in Ontario, and, therefore, if we are able to give the buyer some idea of their relative feeding value, we shall have done something towards advancing scientific and practical agriculture.

The chemical analyses of the different by-products collected by us or furnished by the manufacturers during the past two years will be shown in a bulletin, which is now nearly ready for the printers. I may state that the methods of analysis followed were those of the Association of Official Agricultural Chemists. In addition to the chemical examination, the samples collected were subjected to careful microscopic examination, so far as time permitted. The chemical analysis gives valuable information as to the total quantities of important food materials contained in the feeding stuff. Certain by-products vary considerably in composition, according to the character of the season, methods of manufacture, etc., and unless they have an entirely abnormal composition, it is impossible to say with any certainty whether or not they are pure goods. It is, therefore, possible by putting in moderate quantities of foreign materials, especially if these do not vary much in composition from the by-product adulterated, to keep the chemical composition of the feed within such limits as not to give any positive evidence of adulteration. Since, however, foreign material in any feed can be readily shown under the microscope, the combined chemical and microscopic examination is almost certain to detect any adulterations. We can thus determine whether the seed used in the manufacture of oil was properly cleaned ; whether screenings, no matter how finely ground, have been mixed with mill feeds, and so forth.

Before discussing in a general way the results of the analysis of the samples of by-products, it might be advisable to explain briefly some of the terms used in discussions of the composition of feeding stuffs. In the ordinary chemical analysis of feeding stuffs the following components are generally determined : moisture, protein, fat, crude fibre, ash, and nitrogen-free extract. Taking these in order we note :

1. That moisture (water) is found in varying quantities in all foodstuffs. A high water content in a concentrated foodstuff is a decided detriment. First, because it diminishes the percentage of actual food material, and, second, because it causes the food to mould or turn sour sooner than if less moisture is present.

2. Protein (or nitrogenous material) constitutes the flesh-forming materials of the food. It furnishes the materials for lean flesh, blood, skin, muscles, tendons, nerves, hair, horns, wool and the casein and albumen of milk, etc. For these purposes protein is absolutely indispensable in the food of animals. No substances free from nitrogen can supply protein.

3. Fat (or ether extract) is the portion of the food which is dissolved from the water-free substance by ether, benzine, gasoline, etc. It is a very important component of feeding stuffs on account of its high value for the production of fat, energy and heat.

4. Crude fibre is a term applied to a group of substances that are of very limited value to the feeder, being not only largely indigestible, so that the digestive juices of the animal do not extract much nutriment from them, but, what is still more important, rendering the rest of the food less digestible by protecting it from the action of digestive fluids.

5. Ash is the non-combustible or inorganic portion of feeding stuffs. Some of the foods richest in protein are also rich in ash materials, and, therefore, of high manurial value.

6. Nitrogen free-extract is that portion of the food which is dissolved by boiling with dilute acids. It consists mainly of starches and sugars. When taken into the system nitrogen-free-extract forms fat or is oxidized to produce heat and energy.

Having thus seen the function of food, and knowing the meaning of the different terms used, we may give a brief review of some of the results obtained, in order to make the work as practical as possible. It has been mentioned that some of the foods richest in protein are also rich in ash material. The result of our work shows that an exception is formed by concentrated feeds, which are by-products, where the seeds are treated with large quantities of water, as in the manufacture of starch and glucose. Such foods should be fed with caution to calves and young stock that consume but little roughage and require a liberal supply of ash material for the formation of bone.

A high percentage of protein is found in the refuse feeds from oil mills, glucose factories, distilleries, breweries, and flour mills. In these various manufacturing establishments the starch or oil has been removed from the grains, and is used for the production of human foods or other commercial articles. The residue is, therefore, very rich in protein. As crops grown on the farm are likely to be deficient in protein, it is important, as a rule, in purchasing feeds to supplement farm-grown crops, to obtain as much protein as possible. Other things being equal, the richer the food is in protein, the more valuable it is to the farmer, that is, if it is of such a character that it can be fed to the animals kept.

In our work we have found the greatest amount of crude fibre in such by-products as oat hulls, corn bran, and similar materials. These possess but a very low feeding value. They may, however, in some cases, have a beneficial mechanical effect, in making a food lighter and thus aiding digestion. Such a food as ground corn is materially benefited by adding to it oat hulls, barley, bran, or some such product.

Our examination of wheat bran, middlings, and other by-products from the flour mill shows that the components of these foodstuffs may vary widely; but it is gratifying to know, on account of the importance and wide use made of these materials, that the quality of the samples examined has been found to be excellent. The only adulterants we were able to detect were particles of flour and whole screenings.

In closing the review of this line of investigation, I wish to emphasize the following points :

1. The value of a food depends to a great extent upon the proportion of digestible food material found therein; but two other factors enter in, namely : first, the amount of work which the animal has to do in digesting the food ; and, second, the time. The first factor is, under normal conditions, by far the more important. If the food fed the animal requires more energy on the part of the animal to digest it than this can furnish the animal, the animal must take from its own body substance in order to live. If, therefore, such materials as straw, chaff, etc., be fed in considerable quantity, they not only do not supply much nutriment themselves, but reduce that furnished by the rest of the food. The admixture of large quantities of such materials as oat hulls, corn bran, etc., to concentrated foods is, therefore, a positive detriment, in so far as the utilization of other portions of the food is concerned. A moderate use of these refuse feeds, as previously stated, is justifiable and sometimes advantageous.

2. The narrow margin which producers are often compelled to take on beef, makes it absolutely essential that the feeder should take advantage of every means within his power, in order that he may place his animals on the market at the least possible cost. To do this he must be familiar with the relative values of the different foods upon the market. It is, therefore, our duty to supply farmers with as much information as possible on this very important subject.

3. The laws which govern the formation of flesh, fat, etc., are not fully established. Therefore further investigation along this line is of much importance.

4. Chemical analysis has shown that many of our by-producets are rich in valuable food components. Before, however, we can place any relative value on them, it is necessary that we should know to what extent the animal is able to digest them. We hope to be able to carry on this line of investigation, as we believe that data can be obtained which will be of the highest importance to feeders of live stock.

A Study of the Chemical Changes Which Take Place in Cheese During the Ripening Process.

The question of the chemical changes which take place in cheese ripening is a very important one, and one which, for the past three years, has received considerable attention from the Chemical Department of the Ontario Agricultural College. The work of investigating the conditions which affect these changes was commenced by Prof. Harcourt in 1900, and has been carried on continuously through a period of two and one-half years.

I shall now give you a brief summary of our work, and where possible shall point out conclusions which may be of practical value to dairymen. In our first series of experiments we endeavored to discover the influence which "time" has upon the ripening process. From data obtained in this series of experiments, we are led to believe that the amount of soluble nitrogenous compounds increases as cheese age. The rate of the formation of these compounds is more rapid in the early stages of ripening, about 5-8 of the total soluble nitrogenous compounds being formed during the first three months and over 90 per cent. in the first eleven months of a two years' period of study.

The Effect of Different Temperatures on Cheese Ripening next engaged our attention. Prof Dean and his able staff rendered us every assistance in this work, as in all other lines of investigation undertaken in relation to dairy products. Several series of cheese were made in duplicate. One of each pair marked A was placed at once in cold storage. The second, "E," was placed in the ordinary curing room. These cheese were analyzed every month, and the data obtained indicate that soluble nitrogenous compounds increase in cheese ripening quite closely in proportion to increase of temperature. The cheese in the ordinary curing room at two weeks old showed a much higher percentage of soluble nitrogenous compounds than those in cold storage. At a month old the rate of ripening was practically the same in both cases, and at the end of six weeks the cheese in cold storage showed a slight increase in the percentage rate of ripening over the cheese cured at ordinary temperatures. The amide and ammonia compounds, however, were more abundantly formed, and they steadily accumulated in the cheese at higher temperatures.

The influence which salt exerts on the development of soluble nitrogenous substances in cheese was next studied. This part of the investigation proved very interesting, as our results go to show that in cheese containing a high percentage of salt (3 per cent. or over) the soluble nitrogenous compounds are formed more slowly than in cheese containing less salt. This would appear to be due, in part, to the direct action of salt in retarding the activity of one or more of the ripening agents, and, in part, to the tendency of salt to reduce the moisture-content of the cheese.

The moisture-content affects, in a marked degree, the percentage of soluble nitrogen in cheese. Co-operating with the Dairy Department, we studied each experiment carefully, and found that after a period of one month had elapsed the cheese with a higher moisture-content showed a correspondingly higher percentage of soluble nitrogenous substance. I may state that in the manufacture of the cheese used in this experiment, great pains were taken to incorporate as much moisture as possible in one cheese, and to expel the excess of moisture from the second. Prof. Dean made the determinations of moisture and salt. The soluble nitrogen was determined in the chemical laboratory. The first analysis was made immediately after the cheese were removed from the hoops, and the second when the cheese were three weeks

old. Other analyses were made monthly. The results obtained from this series of experiments show that cheese containing more moisture, other conditions being uniform, generally contains larger amounts of soluble nitrogenous substance, especially after the early stages of ripening. There are two reasons why moisture may affect the ripening process in cheese. First, moisture in itself favors the activity of ripening ferments, and, second, the presence of increased amounts of moisture serves to dilute the fermentation products that accumulate.

In the experiments conducted, we made very careful determinations of the various forms of nitrogen in the cheese, namely paracasein, caseoses, peptones, amides, and ammonia. The data secured shows that the first three of these nitrogenous compounds usually vary within narrow limits, and do not as a rule accumulate in cheese in increasing quantities, but after a time decrease. On the other hand, amides and ammonia are found to accumulate continuously during the normal ripening of the cheese. The cold-cured cheese always showed an increase of paranuclein, caseoses, and peptones, while in the cheese cured at high temperatures, we always found a high percentage of amides and ammonia. It is not improbable that the off-flavors sometimes noticed in cheese cured at high temperatures may be to some extent due to the accumulation of these end products (amides and ammonia).

There is one fact mentioned in the early part of this discussion which I should like to repeat, namely, that over 90 per cent. of the soluble nitrogenous substances is formed within the first eleven months. This would appear to indicate that the products of proteolysis in some way affect the chemical activity of the micro-organisms and ferments which bring about the changes. In other words, the accumulation of soluble nitrogenous compounds in cheese appears to diminish the activity of the proteolytic agents, and this in a measure explains the reason why cheese ripen less rapidly after the first period. We all know that when milk casein and its salts, or paracasein and its salts, are acted upon by dilute acids or alkalies under certain conditions, or by enzymes or micro-organisms, the proteid bodies are split up, and thus give rise to a variety of cleavage products already mentioned. The accumulation of these products in cheese is what is commonly called ripening. In the green cheese nearly all of the nitrogenous substance is in the form of paracasein and its salts. As the cheese ripens, the paracasein and its salts are broken down into caseoses, peptones, etc., but when these latter accumulate to a certain point their presence renders inert the agents to which they owe their existence.

In closing this discussion on this line of our work, permit me to point out a few practical considerations which may be gathered therefrom: (1) That high temperatures in ripening promote rapid development of soluble nitrogenous compounds, some of which are undesirable. (2) That cheese with a higher moisture-content ripens more rapidly, but rapid ripening is not conducive to the production of cheese of the best quality. (3) That the ordinary amount of salt used in the manufacture of cheese does not materially affect the ripening process, but a high percentage of salt retards the development of soluble nitrogenous compounds. (4) The conditions of the manufacture of cheese and of ripening determine the rapidity and extent to which chemical changes take place in nitrogenous compounds after ripening. (5) That cheese made and handled so as to ripen slowly is of a higher commercial value.

To these remarks I may add that Dr. Van Slyke has found that increased amounts of rennet favor the development of the valuable nitrogenous compounds in cheese during the ripening process.

The Use of Preservatives.

As yet no work hs been done by our college to indicate the relative merits of the different forms of preservatives placed upon the market. The question of preservatives is a live one at the present time, and deserves more attention from us. During the

past season, few if any of our manufacturers shipped any butter to the British market which did not contain one or other of the preservatives. It is now a recognized fact that if we are to compete with other nations in supplying butter to the British market some form of preservative must be used. The use of small quantities of such a chemical compound as boracic acid does not necessarily mean that the butter is unfit for domestic use. As a matter of fact, this preservative does not injure the flavor in any way, and it improves the keeping qualities very materially.

Miscellaneous.

We had a number of samples of water sent from different districts by dairymen to be examined for impurities. In several cases the result of chemical examination showed the presence of sewage contamination. It might not be out of place, therefore, to utter a word of warning in this connection. Sewage contaminations frequently carry along with them germs of typhoid, cholera, and other diseases. It is, therefore, advisable to have water suspected of containing contaminations of any kind examined; and if these be found, steps should be taken to have the wells filled in.

The analytical work necessary to determine whether a water contains sewage contaminations requires great skill, and the conclusions drawn from the results are not fully agreed on by scientific chemists. There are, however, a number of simple tests that may very often determine whether it is worth while to perform a more elaborate analysis of the water. As these tests are very simple, and can be performed by anyone of an ordinary degree of intelligence, it may not be out of place to mention them. I think they may prove helpful to dairymen in their work.

Tests: (1) Pour half a pint of water to be tested into a wide mouthed bottle or decanter; close it with the palm of your hand, or, better, with a glass stopper; and shake it violently up and down. If an offensive odor is then perceived, the water is probably contaminated by sewage gas, and possibly with other constituents from the same source.

(2) Add to a little of the water a drop or two of dilute sulphuric acid, and enough potassium permanganate to tinge it to a faint rose color; cover the vessel with a saucer or glass plate. If the pink tinge is still visible after a quarter of an hour, the water may be considered wholesome.

(3) Pour a little solution of silver nitrate into a carefully cleaned glass and see that it remains transparent; then pour in some of the water; should a strong milkiness appear that is not cleared up on adding a little dilute nitric acid, the water probably contains sodium chloride, which always exists in sewage water, but very seldom in wholesome water in any considerable quantity, unless near the sea coast.

Alkaline Solution.

During the past season we shipped 178 gallons of standard alkaline solution to dairymen throughout the Province of Ontario. The alkaline solution has replaced, to a certain extent, the hot-iron in testing the acidity of whey, curd, etc., in cheese-making. The value of this test has been pretty clearly demonstrated; and I think the time has come when the manufacture of the standard solution should go into the hands of commercial men. So long as the value of this test was in doubt, it was clearly our duty to assist the dairymen to the extent of manufacturing a reliable solution for them; but the time has come when there is no longer any doubt regarding its value. I would, therefore, recommend that the manufacture of the alkaline solution be discontinued at the College.

All of which is respectfully submitted.

W. P. GAMBLE,
Lecturer in Chemistry.

PART VII.

THE PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College :

Sir,—Allow me to submit my report for 1902-1903 :

Class Room.

The class room work in the forenoons was much the same as in former years ; but we spent more time and gave more attention to practical work during the afternoon periods.

First Year. During the fall term I gave to this class a course of lectures and demonstrations on comparative anatomy. This included a brief, but comprehensive consideration of the skeleton, joints, and muscular system ; the digestive, respiratory, urinary, and generative organs ; the circulatory and absorbent systems, the eye, skin, and foot. We studied principally the anatomy of the horse, having the skeleton and the individual bones of this animal and also a living animal in the class room during lectures. Where important differences exist between the anatomy of the horse and the ox, the attention of the class is drawn to them.

During the afternoon periods, we discussed the erection of horse stables, as regards site, material, ventilation, drainage, kinds and arrangements of stalls, both single and box, feed boxes, mangers, floors, etc.; likewise the general care of horses as regards feeding, watering, grooming, handling colts, educating them to drive, working or exercising them, etc. ; and the care of harness, saddlery, carriages, etc. In addition to the above, I gave a course on judging horses. In this we are handicapped in not having the different breeds and classes in the stables of the institution. I select for demonstrations the best we have, borrow some, and supply some from my own stable.

During the winter term, I delivered a course of lectures on Veterinary Materia Medica, in which I spoke of the properties, actions, uses, and doses of medicines and remedies used for the prevention and cure of the ordinary diseases to which farm stock is subject ; we also discussed the different methods of administering and applying medicines, with the advantages and disadvantages of each.

Second Year. The fall term class room work for this year consisted in the consideration of the causes, symptoms, and treatment (both preventive and curative), of the ordinary diseases of farm stock, with frequent reference to the proper mode of feeding, watering, and general care of stock in order to prevent disease. During lectures, I usually have one of my own horses in the class room and explain the different appearances between a healthy and a diseased animal. In speaking of the diseases of bones, joints, muscles, eyes, skin, feet, etc., I point out on the healthy animal the seat of disease, and explain the changes in structure and appearances produced by the disease. I also have specimens of diseased bones, and when speaking of the diseases of bones I am thereby enabled to show the class the changes of structure that take place as the result of the disease.

During the winter term, I gave a course of lectures on veterinary obstetrics, treating of the phenomena of reproduction, the usual causes of sterility, and the way by which some of them can be removed ; the diseases of both sexes due to the act of reproduction, the general hygienic treatment of pregnant females, the development of the foetus, the phenomena of parturition, the manner of treating ordinary cases of difficult

parturition, with the causes that produce such ; the causes, symptoms, and treatment of the diseases of both dam and offspring, incident to and following parturition, and give special attention to the care of the young. As far as possible, I illustrate these lectures with charts.

In the afternoons, I gave a course of lectures and demonstrations called "Practical Horse," in which I demonstrated with a living horse, the best methods of securing an animal for minor operations, such as opening abscesses, dissecting out tumors, dressing and stitching wounds, firing for spavin, ringbone, and kindred diseases, the different methods of castration, etc. I illustrated the different methods of applying bandages, stitching wounds, dressing and extracting teeth, scarifying lampas, passing a probang in the horse and ox in case of choking, puncturing an ox in case of excessive bloating, etc. In addition to the above, I gave a course in horse judging. As with the first year, we have difficulty in securing even fair specimens of the different breeds and classes. We have in the farm stables a few specimens of the agricultural horse. I supply from my own stable fair specimens of saddle horses and hunters ; for the other classes, I borrow or take the class to the farms of local breeders.

Third and Fourth Years. To these classes, I gave instructions on judging horses, following the same plan as with the first and second years.

Special Classes. Two special short courses (of two weeks each) in stock judging were given ; one in January, which was attended by about 250 farmers and farmers' sons, and one in March, attended by about 40 Farmers' Institute workers. During the latter course, I was ably assisted by Dr. Quin of Brampton. The erection of the judging pavilion for this purpose made the facilities as complete as possible. Here again the want of horses suitable for the purpose was keenly felt, and freely commented upon by those in attendance. I secured suitable animals from the citizens of Guelph, local dealers, breeders, and farmers. I wish to take this opportunity of publicly expressing our gratitude for the kindness of the following gentlemen in providing subjects for comparison and discussion, viz., Messrs. Sorby, McCannell, Hurley, Atchison, Stewart, Tovell, Smith, and Tyson. As a matter of course, horses brought before a class of this kind are subjected to severe criticism, and are not always placed just where their owners think they should be in a class. There is no point upon which the average horse owner is so sensitive as he is regarding the quality and merits of his high class horse ; and while we had many horses of this kind, it was noticeable that, while severely, and in some cases unjustly criticized, the owners took it all in good part. Unfortunately, this is not always the case ; but we endeavor to avoid any unpleasantness by asking favors of this kind from those whom we think will not be over-sensitive. The members of both classes expressed themselves as being highly pleased, both with the object of the classes and the manner in which they were conducted.

I would like to draw the careful attention of the Department to the points already noted, viz., the lack of horses suitable for class room purposes, even for the regular classes. We have not a pure-bred horse at the institution, nor even a fair representative of any class other than the ordinary work or agricultural horse. For the special classes, it is possible to borrow ; but for the regular classes, this is impracticable, as we cannot expect outsiders to be continually supplying us. While, even under existing conditions, the results where our students have entered into competition with students of other colleges and the general public, in judging competitions at fairs, have proved that our efforts have not been in vain, much better results would doubtless be noticed if we had even a few typical animals. We realize that it would entail considerable expense to provide a number of each recognized breed and class ; but might we not get a stallion and two or three mares of, say, Clydesdales or Shires and Hackneys at first, and gradually increase the classes ? The stallions could do stud service, and thereby assist in reducing expenses. This would gradually bring the facilities for giving instruction in horse judging on a par with that which exists in the other classes of stock.

Diseases and Ailments in Stock.

Besides class room and practical work, I gave professional attention to all the stock of the institution, and am pleased to be able to state that the losses were few.

Horses. We had a few cases of the ordinary diseases in horses, viz., colic, acute indigestion, lymphangitis, influenza, wounds, calks, bruises, broken knees, sore shoulders and necks, eczema, oedema, etc., all of which recovered. We had a fatal case of acute indigestion, quickly followed by rupture of the stomach in a mare belonging to the gardener's department. This is the first fatal case of illness in horses that has occurred during the eleven years that I have held my present appointment. A mare belonging to the experimental department that was successfully treated for ringbone five years ago again went lame this fall. I fired her in the class-room in the presence of the second year class ; but, as she is old, it is doubtful if the operation will prove successful.

Cattle. We had a case of parturient apoplexy, several of difficult parturition, retention of the placenta, mammitis, sore teats, indigestion, impaction of the rumen, fardel bound, uterine discharge, and other ordinary diseases, all of which yielded to treatment. We had one case of lump jaw, for which the iodide of potassium treatment was used ; this consists in administering 1 dram of the drug three times daily and gradually increasing the dose until the patient shows symptoms of iodism (poisoning by iodine), which are, refusal to take food or water, slavering from the mouth, and discharge from eyes. When any of these symptoms appear the administration of the drug must stop, and, if necessary, treatment may be repeated in 3 or 4 weeks. In the case mentioned, treatment arrested the disease ; but, as the bone was considerably enlarged, the growth did not entirely disappear.

Sheep. We had little trouble with our sheep. We had one fatal case of inversion of the uterus in a ewe, and two or three fatal cases of wood balls in the stomachs of lambs.

Pigs. In the experimental piggery we lost a few pigs from pneumonia; otherwise we had no losses, except a few newly-born ones.

I have the honor to be

Your obedient servant,

J. H. REED,
Professor of Veterinary Science.

PART VIII.

THE PROFESSOR OF DAIRY HUSBANDRY.

To the President of the Ontario Agricultural College :

Sir,—I beg leave to submit my thirteenth annual report of the Dairy Department of the College. The year has been a successful one in many respects. Our milk supply is steadily increasing, and we now have sufficient for our Dairy School and for experimental work. Mr. McFeeters, our buttermaker, left the dairy at the close of the Dairy School term, to act as one of the instructors in buttermaking for the Western Dairymen's Association. His place was taken for the remainder of the year by Harry Rive, B.S.A. Mr. Stratton continued in charge of the experimental cheese work, and supervised the dairy work generally. I am specially indebted to Mr. Stratton for his good work during the past year. Mr. Witter also, who has charge of the dairy herd, has done excellent work.

During the year, a carbonic anhydride ice machine was installed at the dairy. While the results, during the past season, have not been so satisfactory as we expected, we are hoping for better results next year. The machine is somewhat expensive to run, and is rather delicate in construction for the average buttermaker to operate. While it is working, it does good service, but the chief difficulty consists in preventing the leakage of gas. Owing to the high pressure to which the gas is subjected, it seems almost impossible to prevent it leaking from the valves, joints, etc., connected with the system.

Our herd is larger at present than at any time during the past thirteen years. However, several of the cows will be sold for beef early in 1904, owing to failure to breed, or other causes, which make them likely to be unprofitable as milkers. We have representatives of three breeds—Holsteins, Ayrshires, and Jerseys. We are culling out the poor cows and aiming to increase the standard of production all the time. Three Holstein heifers and one Jersey bull calf were sold at the College sale, held in the autumn.

During the coming year, we should like to place cement floors in several parts of the dairy building and also in the dairy stables. We should also like to instal an electric motor at the dairy barn for cutting feed, etc., and one in the dairy building for running the buttermaking machinery. The rope drives used in the past are very unsatisfactory.

The Dairy Department has furnished to the College, during the year, milk and cream to the value of about $1,200.

A course of lectures and practical work was given to the College students of the first, second, and fourth years.

The Dairy School.

The various sessions of the Dairy School were well attended during the year. The regular school, held during January, February, and March, was attended by 88 students. In addition, 46 ladies registered for the special Domestic Science lectures, so ably given by Miss Helen Given, of Hamilton, to the young ladies of the dairy class.

A special ten days' session was held for instructors employed by the Western Dairymen's Association, as well as for others who might wish to qualify for the work. The number attending this course was sixteen. Mr. J. A. Ruddick, Chief of the Dairy Division, Ottawa, very kindly assisted with lectures for this class.

During the summer, twelve students took practical work in the dairy. In the month of December, the special creamery class was attended by ten buttermakers—nearly

all experienced men. It will thus be seen that we have students in attendance at the dairy practically the whole year. The total attendance at the Dairy School, exclusive of the regular College students, and including the Domestic Science class, was one hundred and seventy-two.

We are aiming to improve the Dairy School courses each year. More attention is now paid to experimental work with advanced and experienced students. Many of our students know the routine of cheese and buttermaking, but are much interested in making experiments along various lines. To do this work effectually, separate rooms, and special sets of apparatus ought to be provided, as well as instructors who have had special training as experimenters. However, we have made a beginning and hope to improve in methods and apparatus as we gain experience. This feature of dairy teaching is likely to be the most effective yet adopted. This was especially noticeable in the creamery class during December, when experiments in the pasteurization of sweet and ripe cream and with the various kinds of hand separators, proved very interesting and profitable to the class.

We are indebted to the instructors for their valuable co-operation and help, to Professors Harrison and Gamble for bacteriological and chemical assistance, and to several of the College professors for aid in lectures during the school term.

EXPERIMENTAL WORK.

Market Milk.

The importance of pure and wholesome milk for household purposes is recognized by all. Every Canadian home is interested in pure milk for table use. During 1902, a series of experiments was conducted relating to this question. This year, a similar series was carried on in the months of July, August, and September. A portion of the milk was from our own herd; but for the majority of the experiments, the milk was that supplied by regular patrons of the Dairy Department. This milk would, therefore, more nearly resemble the milk sold in towns.

The milk in each experiment was divided into from six to eight different lots. Samples were placed in sterilized bottles,—marked Normal, Clarified, Pasteurized at 140 degrees F., Clarified at 140 degrees F., Pasteurized at 160 degrees F., Clarified at 160 degrees F., Pasteurized at 180 degrees F., and Filtered. The samples marked Normal were from the milk as delivered by the patrons. The Clarified samples were run through an Alpha De Laval separator at ordinary (90 to 95 degrees) temperatures. The Pasteurized samples were heated at 140, 160, and 180 degrees in a Danish pasteurizer, while samples at temperatures of 140 and 160 degrees were also run through an Alpha separator. The Filtered samples were run through cotton-batting filters, which were used but once and then destroyed. The lots were then placed in cold storage at a temperature of about 40 degrees for twenty-four hours, when they were brought into the butter room of the dairy for two to four hours, where the temperature ranged from about 60 to 85 degrees, and were scored. Usually the samples were put back into cold storage for another twenty-four hours ; but sometimes they were left in the butter room until the second scoring, which took place twenty-four hours after the first. At the end of this time, the samples were scored according to the following scale : Smell, 20; taste, 25; acidity, 35; cream, 15; appearance, 5.

The acidity was ascertained with an acidimeter and the scoring was made on the following basis :

Milk containing less than .15 per cent. acid received 35 points.
Milk containing .15 per cent. acid received 34 points.
Milk containing .16 per cent. acid received 33 points.
Milk containing .17 per cent. acid received 32 points.
Milk containing .18 per cent. acid received 31 points.
Milk containing .19 per cent. acid received 30 points.

Milk containing .20 per cent. acid received 28 points.
Milk containing .21 per cent. acid received 26 points.
Milk containing .22 per cent. acid received 24 points.
Milk containing .23 per cent. acid received 22 points.
Milk containing .24 per cent. acid received 20 points.
Milk containing .25 per cent. acid received 18 points.
Milk containing .26 per cent. acid received 15 points.
Milk containing .27 per cent. acid received 12 points.
Milk containing .28 per cent. acid received 9 points.
Milk containing .29 per cent. acid received 6 points.
Milk containing .30 per cent. acid received 3 points.

Above .3 per cent. acid, no points were allowed.

The Acidity of the Samples. The following table shows the percentage of acid, reckoned as lactic acid, which developed in the samples at the end of twenty-four and forty-eight hours. The striking point, is the small amount in all the samples which were heated to 180 degrees. The highest amount of acid at the end of forty-eight hours was but .27 per cent. Some of the samples heated to 160 degrees developed a high acidity at the end of forty-eight hours, although they were all good up to twenty-four hours. The average of all the pasteurized lots was within the limits of market milk.

	Percentage of acid at end of 24 hours.			Percentage of acid at end of 48 hours.		
	Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
Normal	.47	.17	.27	.90	.20	.51
Clarified	.39	.16	.24	.88	.19	.50
Past. 140	.21	.15	.18	.80	.16	.24
Clar. 160	.25	.16	.18	.80	.17	.27
Past. 160	.19	.15	.17	.82	.15	.22
Clar. 160	.20	.15	.16	.78	.16	.22
Filtered	34	.18	.25	.91	.20	.52
Past. 180	17	.10	.15	.27	.13	.16

Results of the Scoring. The following table shows the average of first and second scorings in the eight lots of milk. It will be noticed that there was not much difference in the lots at the first scoring, except for acidity. The pasteurized lots received a higher scoring at both times for acidity ; in other words, the heating caused the samples to remain much sweeter. On the other hand, the depth of cream was much less, especially on those samples heated to 160 and 180 degrees. In some cases, where the samples were cooled to 40 degrees immediately after heating, the cream rose fairly well, but this was not so in every case.

	Smell max. 20.		Taste max. 25.		Acidity. max. 35.		Depth of cream. max. 15.	
	Av. 1st S.	Av. 2nd S.	Av. 1st S.	Av. 2nd S.	Av. 1st S.	Av. 2nd S.	Av. 1st S	Av. 2nd S.
Normal	16.8	11.7	20.8	11.5	17.	10.4	14.3	13 9
Clarified	16 8	12.8	20.7	11 5	20.1	8.2	12.	11.8
Past. 140	18.	13.7	23.	17.3	30.7	27 3	12.	10.7
Clar. 140	17.6	13.6	22.5	16.9	30.4	25.1	10.9	10 8
Past. 160	18.9	15.9	23.6	19.	31.9	29 6	8.4	8.3
Clar. 160	18.7	15.8	23.1	18.8	32.	28.7	8.4	8.8
Filtered	18.1	9.1	22.	10.1	16.2	9.3	12.2	12.2
Past. 180	18.2	17.	23.2	21.	33.4	31.1	7.5	7.8
Average of all	17.8	13.7	22.3	15.7	26.4	20.5	10.7	10.5

Average of all the Scorings. When we average all the results, the lots heated to 140 degrees stand first at the end of twenty-four hours. At the end of forty-eight hours, the lots heated to 180 degrees stand first. The clarified lots scored lower in every case than the lots not run through a separator, when both were under the same conditions of temperature. Filtering the milk added very little to the quality as shown by the scoring:

Kind.	Average 1st score Max 100.	Average 2nd score, Max. 100.
Normal	72.6	39.9
Clarified	71.7	34 9
Past. 140	88.5	73 2
Clar. 140	85.5	66.9
Past. 160	87.6	76.4
Clar. 160	86.3	75.
Filtered	73.4	40.2
Past. 180	87.	80.2
Average of all	81.57	60.83

Conclusions. Milk which is consumed inside of twenty-four hours after delivery to the dairy company or retailer will probably give best satisfaction if heated to about 140 degrees and afterwards cooled to below 50 degrees. However, for hot weather and for average conditions of delivery, the best results are got by heating to 160 or 180 degrees, and then cooling to about 40 degrees. Where the milk is produced under the most sanitary conditions, heating will not be necessary. Cooling such milk to 40 degrees will secure milk in possibly the best condition for household purposes. This plan is not likely to be adopted except on a limited scale, and such milk usually sells for a high price. For average town trade, especially by dairy companies, the heating and cooling is possibly the best method to adopt, as it checks the development of lactic acid; or, in other words, it prevents the souring of the milk, produces milk with a cleaner flavor, and tends to destroy disease or other bad germs which may be in the milk.

The results confirm those obtained last year regarding clarifying, or running milk through a centrifugal machine. The only advantage seems to be to remove dirt from the milk. It seems to not improve the flavor, etc., but rather lessens its value. Filtering also appears to be of doubtful value, except to remove dirt.

Testing Cream.

Oil Test vs. Babcock Test for Cream.

This is a continuation of the work done in 1902. Six experiments were made, a vat of ripened cream being used in each case. Duplicate samples of cream were taken for both tests. The percentage of fat in the cream ranged from 31.5 to 35.5 and averaged 33.29. The oil-test ranged from 150 to 170, and averaged 156.75. In the six experiments, 305.6 inches of cream weighing 1,270 pounds were used. The average pounds of cream per creamery inch were 4.15. The estimated yield of butter by the oil-test was 479 pounds. The actual yield was 502 pounds. The "overrun" on the oil-test averaged 4.62 per cent., while that on the Babcock test for fat averaged 18.6 per cent. In each experiment, the churn yield was greater than that called for by the oil-test churn. This increase varied from half a pound of butter to over eight pounds on an average-sized churning of 51 inches of cream.

Conclusion. The oil-test is not a very reliable test for dividing proceeds of sales of butter among patrons who deliver cream, and should be superseded by the Babcock test as soon as the change can be conveniently made. It is better, however, for creamerymen not to make the change without explaining to patrons why the change is made, and how it is likely to affect the results to them, thus avoiding suspicion and loss of patronage.

Buttermaking.

Cultures for Buttermaking.

The flavor of butter made from pasteurized cream depends almost entirely upon the character of the culture, commonly known as "starter," used in ripening the cream. The butter made in the Dairy Department of the College is made from cream which has been separated from milk heated to about 185 degrees F., before separating. This plan has proved very satisfactory ; it has given us a uniformity in the product which can be got in no other way. As previously stated, however, such butter depends nearly altogether for flavor upon the character of the culture or ripening medium. This being so, we are naturally on the lookout at all times for an improved culture.

Through the courtesy of Prof. Harrison, of the Bacteriological Department, we have been supplied during the past year with excellent cultures. In the latter part of September and the fore part of October, seven tests were made of a German culture compared with our ordinary lactic acid culture. Prof. Harrison gives the following bacteriological data of the cultures : "The culture consisted of the lactic acid organism which we are sending out to cheese factories and creameries, together with a culture of a mould of Oidium lactis. This mould was discovered by Dr. Weigmann, of the Experiment Station and Dairy Institute of the Province of Schleswig-Holstein, Germany. Dr. Weigmann informs me that this organism does not give such a pleasant taste and odor as it formerly did, but even now favorable results may be had from its use. The culture supplied to the dairy was perfectly pure, containing only the lactic acid bacillus and the Oidium. The culture that you compared it with was one of the lactic acid organisms that you have been using in the dairy during the past season."

The tables show the scorings of the lots of butter made by using the two cultures. As will be seen from the results, there was little or no improvement in the quality of the butter from using the German culture. The butter, when first made, had a more pronounced flavor than did the butter made by using the ordinary lactic acid culture. However, the aroma was not so pleasant, and it seemed to go off in flavor more quickly than did the butter made by using our ordinary culture. The flavors were so different when first made, that it was difficult to decide whether or not the butter made by using the German culture was any improvement. On the whole, we decided that there was little or no improvement in flavor, and that we got better results from using the ordinary lactic acid culture in the pasteurized cream. This was specially so when keeping quality was considered.

Sample No.	Flavor (Max. 45.)	
	College Laboratory.	German.
22 Average of all	42.	41.6
23 "	41.6	42.
24 "	42.	40.6
25 "	42.	38.5
28 "	42.	40.5
29 "	42.	41.5
4 "	.....	42.
Average of 1st score	42 6	42.7
Average of 2nd score	41.5	39.8
Average of 3rd score	41.3	40.
Average total 1st score	97.6	97.7
Average total 2nd score	96.5	94.8
Average total 3rd score	96.3	95.

Cold-Storage for Butter.

The object of the following experiments was to determine, (1) the relative advantage of ice and mechanical cold-storage for holding butter; and (2) whether or not it is best to put butter directly into a low temperature or to place it in a moderately cold room for a short time, and then move to a colder temperature.

Ice vs. Mechanical Cold-Storage. During July, August, and September, ten 28-pound boxes of butter were made on five different dates, from five different churnings. One of these boxes on each date was placed as soon as made in the Hanrahan ice cold-storage. The other from the same churning was placed in one of the compartments of the mechanical cold-storage. The temperature in both places ranged from 38 to 40 degrees. The lots of butter were scored the first time in from one to two weeks after being made. The second scoring was made one month later, and the third about three months after the butter was made.

There was not much difference in the quality of the different samples at the first scoring: but at the second and third scorings, there was a slight difference in favor of the lots in the mechanical cold-storage. The average of all the scores for flavor was 38.9 out of a possible 45 for the lots in ice cold-storage, while those in the mechanical storage averaged 39.8,—a difference of about one point in favor of mechanical cold-storage. The average of the total scores was 93.5 out of 100 for the lots in ice cold-storage, while the samples in mechanical storage averaged 94.8,—a little over one point in favor of mechanical cold-storage for butter.

Moving Butter from a Moderate to a Low Temperature.

On alternate weeks with the foregoing experiments, two boxes of butter were made, one of which was placed in mechanical cold-storage where the temperature ranged from 38 to 40 degrees, while the other box from the same churning, was put into mechanical storage at once, where the temperature was 28 to 30 degrees F. These lots were scored at periods of about one week, one month, and three months after being made.

There was little or no difference in the lots at the first time of scoring, about one week after being made. At the second and third scorings, the lots put at once into the refrigerator at the low temperature were better in flavor, though there was little or no difference in other points. The average of all scores in flavor was 41.8 for the lots placed directly in cold-storage at the low temperature. Those which were placed for one week in a refrigerator at an average temperature of 38 to 40 degrees and then removed to a temperature of 28 to 30 degrees, scored an average of 41.2 out of 45, for flavor—or about half a point less than the lots put at once into cold-storage at 28 to 30 degrees. The total average scorings were 96.8 and 96, respectively, for the lots at the low temperature and for those moved from a moderate to a low temperature at the end of one week.

Conclusions. 1. Mechanical cold-storage at the same temperature, according to these experiments, appears to be more favorable for holding butter than an ice-cold storage, probably on account of the drier atmosphere in the mechanically cooled room.

2. Butter placed directly in cold-storage at 28 to 30 degrees F. was better in flavor at the end of one and three months than were similar lots placed for one week in a refrigerator at a temperature of 38 to 40 degrees F., and then moved to a colder room. These experiments indicate the advisability of placing butter as soon as made in a refrigerator where the temperature is as low as possible.

3. While the mechanical cold-storage has given the best results as compared with ice for holding butter, the expense and difficulty of operating these machines, as at present constructed, make their use too expensive for the average creamery.

Cheese Experiments.

The ripening or curing of cheese is such an important question at the present time in relation to our cheese industry, that most of the experimental cheese work of the past year had reference to this phase of cheesemaking. Continuing the policy, which we have followed for several years, we have carried on several lines of work done in former years, and have added some new features in 1903. We think that more accurate information can be obtained by carrying on important experiments for several years, rather than depending upon work done during one season.

The milk for our cheese work is nearly all supplied by patrons who deliver it, as is commonly done at cheese factories throughout the country. The amount required for each experiment is carefully weighed and sampled for fat-content. A test of the acidity is made; and if the milk is to be divided, the whole lot is mixed in one vat, and the separate quantities required are taken out and carefully weighed. At the same time, we are careful to have the same quality of milk, as far as possible, in each vat. In our regular work, the cheese are made according to Canadian Cheddar principles as taught in the Dairy School, and practised throughout Ontario. Most of the cheese were made into "flats," weighing about thirty pounds each. Some large cheese were made for special experiments. After taking the cheese from the press they were accurately weighed and marked, and placed in the various ripening (or curing) rooms, of which we have eight in our dairy. Six of these were used for the experiments of the past season. Our ordinary ripening rooms were cooled by means of a sub-earth duct. The temperature was fairly uniform at about 60 degrees F. to 65 degrees F., and averaged 61.70 degrees for the season. The percentage of moisture in the air averaged 78 for the season. Two of the other rooms were cooled by the use of ice, and three of them by mechanical refrigeration—the ammonia system.

In from six weeks to two months after being made, the cheese were scored by an expert according to the following scale of points: Flavor, 40; closeness, 15; even color, 15; texture, 20; finish, 10; total, 100. All cheese were scored full points (10) for finish. We are indebted to Messrs A. T. Bell, I. W. Steinhoff, and G. H. Barr for assistance in scoring these cheese.

After the first scoring, the cheese were usually scored again in about one month's time, and, if necessary, once a month thereafter, until it was considered that there would be no advantage in further scoring. The cheese were then sold.

The various cheese experiments of the year may be conveniently grouped into several series.

Series A 1.—Ripening in an Ordinary Room versus Ice and Mechanical Cold Storage. Cheese moved from Ordinary Room to Ice Cold Storage at End of One Week.

In this series nine lots of cheese were made between May 4th and November 9th. The quantity of milk used for each experiment averaged 1,607 pounds, testing an average of 3.7 per cent. fat. Five cheese, weighing about 30 pounds each, were made from each lot of milk. The cheese marked A were placed, when taken from the hoop, in an ice cold storage, which was at an average temperature of 40 degrees F., and the moisture in the air was 87 per cent. The B cheese were in mechanical storage at 40 degrees F. The C cheese were ripened in a mechanical storage of 50 degrees F. The D cheese were ripened in an ordinary room at 61 degrees F. for one week. These D cheese were then moved into an ice cold storage at 40 degrees F. The E cheese were ripened in the ordinary room.

The aim of the experiments was:

1. To compare an ordinary ripening room with ice and mechanical cold storage for ripening cheese.

2. To compare ice and mechanical cold storage for cheese ripening—both at the same temperature.

3. To compare the effects of two different temperatures—40 and 50 degrees, in mechanical cold storage, where the percentage of moisture in the air was about 76.

4. To note the effects of leaving cheese for one week in an ordinary ripening room before moving them to an ice cold storage.

5. To determine the loss of weight when ripening under the various conditions.

Series A. 2. Cheese moved from ordinary room to mechanical cold storage at end of one week.

As series A 2 is very similar to A 1, we shall consider the results together. The chief difference in these two experiments is that in the second series, the D cheese were moved at the end of one week from the ordinary room to the mechanical cold storage, where the temperature averaged about the same as it did in the ice storage. The chief object was to see whether or not there was any difference in quality when cheese were moved at the end of a week into a mechanical storage from an ordinary room as compared with ripening for the full period in an ordinary room, ice storage, or mechanical cold storage.

Between May 11th and November 16th nine lots of five cheese each were made from an average of 1,590 pounds of milk, testing 3.7 per cent. fat. The cheese were weighed when taken from the hoops, and marked A, B, C, D, and E, as in series A 1. The A cheese were ripened in an ice storage at 40 degrees F., the C's in mechanical storage at 50 degrees F., the D's for one week in an ordinary room and then moved to mechanical storage at 40 degrees F.; the E's in an ordinary room at 61 degrees F., and the B's in mechanical storage at 40 degrees F.

Table Showing Results in Series A 1 and A 2.

Cheese.	Method of Ripening.	Percent loss in weight in 1 month.	Average Score.				
			Max. 40 Flavor.	Max. 15 Closeness.	Max. 15 Even Color.	Max. 20 Texture.	Max. 100 Total.
A (series a 1) ...	Ice storage at 40 degrees F	1.9	37.0	14.2	14.6	18.5	94.4
A (series a 2) ...	Mechanical at 40 degrees F	2.3	37.0	14.1	14.6	18.4	94.2
B (series a 1) ...	Mechanical at 40 degrees F	3.0	37.7	14.1	14.4	18.6	95.0
B (series a 2) ...	Mechanical at 40 degrees F	2.7	37.8	14.5	14.5	18.6	95.6
C (series a 1) ...	Mechanical at 50 degrees F	3.3	36.8	14.1	14.4	18.0	93.5
C (series a 2) ...	Mechanical at 50 degrees F ...	3.2	37.0	14.3	14.3	18.1	93.8
D (series a 1) ...	Moved to ice storage 40° F.	2.9	36.8	13.9	14.4	18.3	93.5
D (series a 2) ...	Moved to mech. storage 40° F.	3.0	37.7	14.4	14.4	18.6	95.3
E (series a 1) ...	Ordinary room 61° F.....	4.0	33.8	13.5	13.8	16.9	88.2
E (series a 2) ...	Ordinary room 61° F.....	3.9	32.9	13.5	13.9	16.7	87.1

Conclusions :

1. As in former years, the cheese ripened in an ice cold storage at 40 degrees F. were superior in quality to those ripened in an ordinary room at an average temperature of 61 degrees F.

2. In the first series, the cheese ripened in mechanical cold storage at 40 degrees F. averaged slightly better than did those in the ice cold storage at the same temperature. The improvement was chiefly in the flavor of the cheese.

3. In both cases the cheese ripened at 40 degrees F. gave better results in quantity than did those ripened at a temperature of 50 degrees F. The improvement was chiefly in flavor and texture of the cheese.

4. The cheese which were allowed to remain in an ordinary ripening room for one week before being moved to an ice cold storage scored slightly lower (.9 points) than those ripened altogether in the ice cold storage. The cheese moved at the end of one week to a mechanical cold storage scored slightly higher (1.3 points) than did those ripened for the full period in the cold storage. We may conclude that there is little or no risk in spoiling the quality by allowing cheese to remain in an ordinary room for one week, so long as the temperature does not go above 70 degrees before moving to cold storage.

The shrinkage during one month in the A series, ripened in an ordinary room, was 4 per cent. In the second series it was 3.9 per cent. The cheese ripened in an ice cold storage lost an average of 1.9 per cent. in one month. Those ripened in mechanical cold storage at 40 degrees F. lost 2.6 per cent., while those ripened at 50 degrees F. lost an average of 3.25 per cent. The cheese moved to ice cold storage at the end of one week lost an average of 2.9 per cent., and those moved to mechanical storage lost 3.0 per cent. The shrinkage was greatest in the ordinary room averaging about 4 per cent. for cheese weighing about 30 pounds each. The loss was least in the ice cold storage, being less than 2 per cent., or about one-half the loss sustained in the ordinary room. The shrinkage was greater in the mechanical cold storage than in the ice storage, and increased with the rise in temperature. The loss was about one-half a per cent. greater at 50 degrees than at 40 degrees. The cheese allowed to remain in the ordinary room for one week lost 1 per cent. more than those ripened for the full period in an ice cold storage, and about one-half a per cent. more than those in the mechanical storage.

Summing up, we may conclude that a temperature of 40 degrees gave best results in ripening cheese in both series. The quality of the cheese was slightly better in the mechanical cold storage, but the shrinkage in weight was greater than for the cheese ripened in the ice storage. The loss in shrinkage is greater from leaving in the ordinary room for one week, but the effect in quality is very little.

Series B.—Moisture in Curd and Cheese.

Between April 28th and August 22nd, the moisture in sixteen lots of cheese was determined at four different stages, viz., dipping, milling, green cheese, and ripe cheese. It was designed that the lots marked A should contain an excessive amount of moisture at all four stages, while the lots marked B were made normal as nearly as possible. The two chief objects of the experiments were to ascertain what amounts of moisture are usually left in curd at different stages, and also the relative amounts of moisture which green and ripe cheese contain. We also wished to see how much extra moisture may be left in curd and cheese without affecting the quality. Some of the lots were ripened in an ice cold storage and some in a mechanical cold storage—both rooms at a temperature of 38 degrees to 40 degrees F.

The average percentage of moisture in the two lots was :

	A.	B.
At dipping	55.195	51.297
At milling	42.423	40.433
Green cheese	36.075	34.154
Ripe cheese	35.656	33.889

The percentage of salt in both lots of green cheese was also determined with a standard silver nitrate solution after washing the cheese repeatedly in warm water. The A lots averaged 2.49, and the B lots 2.40 per cent. of salt.

The cheese of the different experiments were judged from time to time, usually once a month, during the season. The following is a summary :

Method of Ripening.	A cheese containing excessive moisture.			B cheese containing normal moisture.	
	Scoring.	Av. flavor (max. 40.)	Av. total score. (max. 100.)	Av. flavor (max. 40.)	Av. total. (max. 100.)
In ice cold storage 38°-40°....	1st score	36.7	93.2	37.5	95.5
" "	2nd score.	34.6	88.5	35.3	91.1
Mech'l cold storage 38°-40°....	1st score..	37.7	94.7	38.2	96.2

Conclusions :

1. Normal curds contain about 50 per cent. moisture at dipping, 40 per cent. at milling, 34 per cent. when taken from the hoops, and when ripened in cold storage at a temperature of 38 degrees to 40 degrees the cheese at the end of one month will have lost very little moisture.

2. An excess of about 2 per cent. moisture in the green and ripe cheese did not materially affect the quality of the cheese. However, the average quality of those lots containing excessive amounts of moisture and ripened in cold storage was slightly poorer than was the quality of those lots containing a normal amount of moisture.

3. By reducing the amount of stirring given to curds after dipping, the moisture content of cheese may be increased one or two per cent., and where the cheese are ripened at a temperature of about 40 dgrees F. in mechanical cold storage, there would appear to be little danger of injuring the quality of the cheese.

4. The A cheese in ice cold storage lost 2.1 per cent. in weight in one month, the B cheese 3.4 per cent. In mechanical storage the A cheese lost 4 per cent., and the B cheese 3.4 per cent. In the ice storage the cheese with the excessive moisture lost less, and in the mechanical storage they lost more, in weight during one month.

Series C.—Effect of Rennet on Cheese Ripened in Cold Storage.

Seven lots of cheese, in which two, three and one-third, and six ounces of rennet per 1,000 pounds of milk, were ripened in a mechanical cold storage at 40 degrees F., between May 29th and September 19th. The cheese marked A were made by using from 2 to 6 ounces of rennet per 1,000 pounds milk. The milk contained an average of 3.7 per cent. fat. The cheese lost 3.1 per cent in weight at the end of one month. They averaged 37.4 points out of a possible 40 for flavor. Their average total score was 95. The B cheese, made from similar milk, but in which three and one-third ounces of rennet per 1,000 pounds milk were used, lost 3.3 per cent. in weight while ripening, and scored the same number of points for flavor. The average total score was 94.7.

Eight lots were made in a similar way, but were ripened in an ice cold storage at 40 degrees F. The A cheese containing from two to six ounces of rennet per 1,000 pounds milk lost 2.2 per cent. in weight during one month, while the B cheese, made with a normal (3 1-3 ounces) amount of rennet, lost 1.8 per cent. in weight. The average scores for flavor were the same in both lots (37.2), and the average total scores were the same, 93.9.

Conclusion :

So far as these experiments have gone, it would not seem to make much difference in the loss of weight while ripening, nor in the quality of the cheese, whether a small amount (2 ounces per 1,000 pounds milk), a normal amount (3 1-3 ounces), or a large amount (6 ounces) of rennet be used in the milk for making cheese to be ripened in an ice or in a mechanical cold storage at about 40 degrees F. As an extra amount of rennet causes the cheese to ripen more quickly, in those cases where cheese are placed in cold storage soon after being made, and where they are needed in a shorter time than usual for market, it would seem to be quite safe to use from four to six ounces of rennet per 1,000 pounds milk without any danger of injuring the quality of the cheese.

Series D.—Effect of Five Different Temperatures on Cheese Ripening.

In this series, which was conducted on six different dates between August 31st and October 5th, thirty-six cheese, weighing about 30 pounds each, were made from 9,643 pounds milk, testing an average of 3.8 per cent. fat. After weighing, the cheese were marked A, B, C, D, and E, five cheese in each lot, and placed in five different rooms at various degrees of temperature and moisture. Two of the rooms were cooled by means of ice, and three of them by means of mechanical refrigeration on the ammonia circulating air plan.

Table Showing Effects of Five Temperatures in Cheesemaking.

Cheese.	Method of ripening.	Av. temp.	Av. per cent moisture in room	Per cent lost in ripening.	Average quality of the cheese.				
					Flavor. Max. 40	Closeness. Max. 15	Even color. Max. 15	Texture. Max. 20	Total. Max. 100
A	Ice cold storage.....	40° F.	78	2.28	37.0	14.1	14.6	18.2	94
B	Mechanical cold-storage	40° F.	76	2.34	37.2	14.2	14.2	18.2	94
C	Mechanical cold-storage	50° F.	76	2.90	37.1	14.1	14.4	18.2	93.8
D	Mechanical cold-storage	29° F.	80	1.80	37.1	14.2	14.2	18.1	93.7
E	Ice cold-storage	53° F.	83	3.60	37.1	14.1	14.5	18.2	93.7

Conclusions :

In a range of temperatures from 29 degrees F. to 53 degrees F., the best results were got from ripening cheese at a temperature of 40 degrees F. In all our experimental work on this question, we have had the best results from ripening cheese at this temperature. There would seem to be no advantage in ripening at a lower temperature, although there were apparently no bad results from ripening the cheese at a temperature as low as 29 degrees F., or three degrees below freezing point. The surprising thing regarding the cheese ripened at this low temperature was the fact that after the first month or six weeks they appeared to "break down" as freely as did those ripened at a higher temperature. After an initial stage, the ripening process appears to take place at about the same rate, regardless of temperature, at least between 29 degrees F. and 53 degrees F.

Whether or not it will pay to ripen cheese at 40 degrees F., as compared with 50 to 60 degrees, is a question which has not yet been settled ; but if we are aiming at the best quality of cheese, a temperature of about 40 degrees F. would seem to be the ideal temperature. The shrinkage is also considerably less at 40 degrees than at 50 to 60 degrees.

Series E.—Moving Cheese from Cold Storage to Ordinary Temperature at end of One, Two and Three Months.

This experiment is a continuation of the work done in 1902, to see the effect of moving cheese from cold storage into a room where the temperature ranged from 60 to 70 degrees F. The cheese were made from April 13th to August 17th—eight lots of five cheese in each. The weight of milk used was 12,557 pounds—an average of 1,572 pounds for each experiment. The fat in the milk averaged 3.7 per cent.

The cheese marked A were ripened during the whole period in an ice cold storage. The B cheese were moved to an ordinary room from the ice storage at the end of one month. The C cheese were moved at the end of two months, the D cheese at the end of three months, while the cheese marked E remained in the ordinary room during all the period of ripening. All the cheese averaged about thirty pounds in weight.

The cheese were weighed when green, and again at the end of one month. Two lots, those of April 13th and August 17th, were weighed a third time at the end of four months, while the lot of July 20th was weighed a third time at the end of five months. The object was to see what loss in weight would occur under these conditions at a time when the cheese would be likely to pass into the hands of retailers.

Cheese.	Method of ripening.	Av. per cent. lost in weight.		Ayerage quality of cheese.				
		1 mo.	4 and 5 mos.	Flavor. Max. 40	Close-ness. Max. 15	Even color. Max. 15	Tex-ture. Max. 20	Total. Max. 100.
A	Ice cold-storage at 40 degrees...	1.64	5.1	36.8	14.1	14.4	18.4	93.8
B	Ice cold-storage, 1 month.....	1.47	7.3	34.1	13.5	14.5	17.1	89.3
C	Ice cold-storage, 2 months.....	1.60	6.9	34.4	13.7	14.7	17.1	89.9
D	Ice cold-storage, 3 months.....	1.60	6.6	35.8	14.0	14.7	18.4	92.9
E	Ordinary room	3.89	7.8	33.0	13.7	14.3	17.0	88.1

Conclusions :

1. The cheese ripened in an ice cold storage at 40 degrees F. are again first in quality.

2. The longer the cheese remained in the cold storage before moving to the ordinary room the better was the quality of the cheese. The improvement was chiefly in the flavor and texture of the cheese.

3. The cheese ripened for the full period in the ordinary room were poorest in quality, as in all the other series.

4. There was no marked deterioration in quality, after moving from the cold storage to the ordinary temperature, especially in those which were left in the cold storage for three months before moving them. A retailer need not expect any rapid deterioration in the quality of the cheese which has been kept for two or three months in cold storage, providing the cheese were of good quality when made.

5. Cheese continue to lose in weight after the first month, whether kept in cold storage or not, but the loss was greater on those cheese moved to the warmer room. This loss can doubtless be prevented to a large extent by coating the cheese with paraffin wax.

Series F.—Placing Cheese on Shelves versus Boxing Directly from the Press.

Between May 2nd and June 27th, eight experiments were made, in which 11,197 pounds milk testing an average of 3.6 per cent. fat, were made into sixteen cheese. Two cheese weighing about 70 pounds each were marked A and B. The A cheese were placed on

shelves in an ice cold storage at an average temperature of about 40 degrees F. and 87 per cent. moisture in the air. The B cheese were put directly into cheese boxes, and were also placed in the same ice cold storage, without turning them in the box or turning the boxes.

The cheese placed on the shelves lost 1.7 per cent. in weight during one month, while those put in the boxes lost 1.06 per cent. The two cheese made on June 18th were weighed a third time on December 17th (six months later), and the cheese on the shelf had lost 4.8 per cent.. while the B cheese in the box had lost 4.0 per cent. The average score for flavor was 36.8 and 37, respectively, and the average total scores were 92.5 and 92.6. There was little or no difference in the quality of the cheese.

Three experiments were made by placing one cheese on a shelf in a mechanical cold storage at 40 degrees F., while a similar cheese from the same vat of milk was put directly into a box in the same storage, without turning the cheese or the box. The cheese on the shelf lost 2.7 per cent. in weight during one month, while those in the boxes lost 2.5 per cent. in the same time. These lots, which were made July 2nd, July 3rd, and October 12th, were weighed on December 17th, when the cheese on the shelf had lost 5 per cent., and those in the boxes 4 per cent. in weight.

The average scoring for flavor was 36.8 and 37.2 respectively, for the cheese on the shelves and in the boxes. The total scores were 94.8 and 95.4, a slight advantage in favor of the cheese in boxes.

Eight experiments were made from June 9th to the 26th, by placing cheese on the shelf in an ordinary ripening room, while similar cheese from the same vats of milk were put directly into boxes in the same room without turning.

The cheese on the shelf lost 3.2 per cent. in weight during one month, while those placed directly in boxes from the hoops lost an average of 2.4 per cent. The average scores were 90.8 and 90.9, practically the same. The chief disadvantages of placing cheese directly in the box in an ordinary room are the large amount of mould on the cheese, and the "huffing" of the cheese, where they are not turned. By turning the boxes frequently this latter difficulty could be overcome.

Conclusions :

1. Cheese may be placed directly from the press in clean, dry boxes, if kept in either ice or mechanical cold storage, without any danger of injuring the quality of the cheese. The only drawback is the mould on the cheese, especially in an ice storage.

The boxing of cheese when green and leaving them in an ordinary ripening room is not to be recommended, owing to the "huffing" of the cheese and the large amount of mould which collects. Spraying with formalin tends to check the latter, while turning the boxes tends to prevent the "huffing."

2. The cheese put directly into boxes lost considerably less in weight than did those on the shelves, hence the plan of boxing is an advantage in this respect, as it saves shrinkage.

3. In this series, as in several of the others, the loss in weight during one month was greater in the mechanical storage, but the quality of the cheese was slightly better than were those in the ice cold storage. Both lots were better in quality, and the shrinkage was less than in those ripened in the ordinary room.

Series G.—Temperatures for Cooking Curds

In this series, which was conducted between July 22nd and October 20th, 3,900 pounds milk, testing an average of 3.7 per cent. fat, were made into thirteen cheese and marked A. A similar lot made from similar milk were marked B, making 26 lots of cheese altogether in the experiment. The A cheese were cooked at an average temperature of 104.4 degrees. The temperature ranged from 102 to 110 degrees. The B cheese were cooked at an average temperature of 99.7, and ranged from 98 to 100

degrees, the usual range of temperature adopted at this stage of Canadian Cheddar cheesemaking.

The average acidity of the two lots at three stages of the making was:

	A. Per cent. acid.	B. Per cent. acid.
Dipping	.186	.190
Milling	.843	.952
Salting	.996	1.155

It will be noticed that the curds cooked at the higher temperature had slightly less acid at all three stages of the process.

The yield of green cheese from 3,900 pounds milk cooked at the higher temperatures was 390.44 pounds, and of ripened cheese 375.44. The normal lots weighed 396.13 pounds when green and 379.5 pounds of ripened cheese. The decreased yield of cheese on 3,900 pounds milk from cooking at the higher temperature was 5.60 pounds green cheese and 4.0 pounds of ripe cheese, or cheese one month old. The A cheese lost 3.7 per cent. in weight during one month, while the B, or normal cheese, lost 4.1 per cent. in shrinkage. The cheese of both lots averaged about 30 pounds each in weight.

The average scores were :

	A.	B.
Flavor	35.8	35.3
Closeness	13.8	13.7
Even color	14.0	13.5
Texture	17.4	16.7
Finish	10.0	10.0
Total	91.0	89.2

Conclusions :

1. Heating the curds to temperatures of 102 degrees to 110 degrees tended to reduce the percentage of acid in the curds at all the important stages of the process of cheesemaking. In the case of curds which tend to "work too fast," it would seem advisable to heat them to a higher temperature than usual in order to check the development of lactic acid. It is possible that normal curds may be advantageously heated to a higher temperature than is now considered necessary.

2. Heating curds to the higher temperatures appears to reduce the yield of cheese obtained from milk. In our experiments the loss was about 4 pounds of ripe cheese on 3,900 pounds milk testing 3.7 per cent. fat.

3. The average quality of the cheese was improved by cooking the curds at the higher temperature.

Further data is necessary on these points before we can speak positively as to the merits of adopting a higher cooking temperature than is now considered advisable by the best Canadian cheesemakers.

DAIRY STOCK.

Cocoa-shell Milk for Calves.

In cheese factory districts farmers find difficulty in obtaining sufficient milk to feed the calves. Various substitutes have been tried, but none of them has proved entirely satisfactory. The by-product in the manufacture of cocoa, known as cocoa-shells (not

cocoanut shells), have been used by some dairymen as a substitute or partial substitute for milk. To test the value of this food for calves, we purchased 200 pounds of the shells in Toronto at a cost of three cents per pound. The freight to Guelph was 91 cents, making a total cost of $6.91 for 200 pounds of the cocoa-shells delivered in Guelph.

The experiment began July 21st and ended September 15th, 1903. Four calves—two pure-bred Ayrshires and two Holstein grades—were used for the test. The Ayrshires were about five months old, and the grade Holsteins about one month old when the experiment began. One Ayrshire and one Holstein were placed in each group. Group 1 was fed on skim-milk, bran, oats, hay, pasture, and some green feed. One calf of group 2 was fed on cocoa-shell milk, meals, pasture, etc., the same as group 1, while the second calf received half skim-milk, and half cocoa-shell milk, meal, etc.

Each calf was weighed on two consecutive days at the beginning and close of each period, which lasted four weeks. At the end of four weeks the groups were reversed.

The cocoa-shell milk was made by boiling one-quarter of a pound of cocoa-shells in two gallons of water. The calves were given from 14 to 20 pounds (1 1-2 to 2 gallons) of the cocoa milk per day. The calves fed on skim-milk and cocoa-shell milk were given equal quantities of each. They seemed very fond of the cocoa-shell milk.

The two calves fed on skim-milk (1 1-2 gallons to 2 gallons per day), meal, etc., gained 148 pounds in eight weeks. The total gain of the two calves fed on the cocoa-shell milk, meal, etc., in eight weeks was 135 pounds. The difference in gain was 13 pounds on two calves in eight weeks in favor of the skim-milk.

Taking the calves singly, we find that one of the Ayrshire calves gained 48 pounds in four weeks on skim-milk, meal, etc., while on the cocoa-shell milk it gained 31 pounds. The other Ayrshire gained 30 pounds on the skim-milk and 42 pounds on the cocoa-shell milk. One of the grade Holsteins gained 45 pounds on the skim-milk and 20 pounds on the milk and cocoa in four weeks, while the other gained 25 pounds on the skim-milk and 42 pounds on the skim-milk and cocoa. This difference in gain appears to have been influenced by the weather, as all the calves made much larger gains in the first period, during the latter part of July and the beginning of August, than during the second period, in the latter part of August and the first part of September.

The total gain of the two Ayrshires on skim-milk was 78 pounds, while on the cocoa-shell milk their gain was 73 pounds. The grade Holsteins gained 70 pounds on the skim-milk, and 62 pounds on skim-milk and cocoa.

Conclusion :

Cocoa-shell milk made by the boiling of about one-quarter of a pound of cocoa-shells in water and feeding from one and a half to two gallons per day along with bran and oats, green feed, etc., appears to be a very good substitute for skim-milk, and is worthy of a trial by those farmers who wish to rear calves and have little or no skim-milk to feed. However, there is probably no substitute which will entirely take the place of milk for young stock.

Sugar Beet Pulp for Dairy Cows.

In the latter part of January, 1903, a carload of sugar beet pulp was sent to the Dairy Department of the College from the beet sugar factory at Berlin. The object of the experiment was to see whether or not the beet pulp would satisfactorily take the place of mangels in a ration for dairy cows. Our regular ration contained corn silage, clover hay, mangels, bran, oats, and oil-cake. For the first ten days of February fifteen cows were given their regular ration, the milk being weighed, as usual, at each milking, and

composite samples were taken for testing. At the end of ten days each cow's composite sample was tested for fat. During the ten days the fifteen cows gave 3,787 pounds milk, containing 130.116 pounds fat. The average percentage of fat from all the cows was 3.43. During the next ten days these cows gave 3,600 pounds milk, which contained 128.062 pounds fat, while being fed beet-pulp instead of mangels in their ration. About 20 pounds (1-3 bushel) of the mangels and pulp were fed to each cow in a day.

During the last day or two of the beet pulp period we were obliged to feed timothy instead of clover hay.

The cows gave 187 pounds less milk on the beet pulp, but there was a difference of but little over two pounds fat on the fifteen cows in ten days, owing to a higher average test. It is not likely that the beet pulp caused this difference.

It is interesting to note that when the cows were changed from mangels to beet pulp the milk of eight cows increased in the percentage of fat, four cows gave milk with a lower percentage of fat, and three gave milk with the same fat content in both periods. Two cows increased in the quantity of milk they gave, and thirteen decreased when beet pulp was substituted for the mangels.

During the month of March we continued feeding the pulp in our regular ration instead of mangels to our whole herd. In the month of April they received mangels again, as the pulp was all fed by the end of March. Eleven of our cows were milking during both months. In March, when fed the sugar beet pulp, they gave 9,196 pounds milk, which contained 326.775 pounds fat. The average percentage of fat was 3.57. During April, when fed mangels, these eleven cows gave 7,775 pounds milk, containing 279.636 pounds fat. The average percentage of fat in the milk for April was 3.59.

In April, when fed mangels, the cows gave less milk and fat than they did in March, when receiving sugar beet pulp. This difference, to some extent at least, was due to advancing lactation in a number of the cows.

Conclusions :

1. Sugar beet pulp produced less milk than mangels in one period and more milk in another period.

2. The cows were fond of the pulp, and ate it as readily as the mangels.

3. When fed along with corn silage, not more than 20 to 30 pounds (about 1-3 to 1-2 bushel) per day should be fed to a cow, as it tends to "scour" them if fed in large quantities in addition to silage. If fed with dry feed, such as cut hay or straw or corn stover, it may be fed quite safely in larger quantities. It is also likely to be more valuable in a dry ration than in one which already contains considerable succulent material, such as silage.

4. In those districts where the beet pulp can be got fresh from the factory, or if it be stored in a silo, it may well be used as a substitute for roots in the ration for cows giving milk.

5. We did not observe any taint or unpleasant odor on the milk while feeding the beet pulp.

Dairy Herd.

The herd at the Dairy Department on December 31st, 1903 consisted of : 11 Holstein cows, 2 heifers, 3 heifer calves, 1 yearling bull and 1 bull calf, 3 Jersey cows and 3 heifers, 4 Ayrshire cows, 2 heifers and 2 calves, making a total of 50, but several of these will be sold shortly to the butcher, as they have proven to be unprofitable.

The record of the herd for the year is shown in the following table :

Record of Dairy Herd from Jan. 1st, 1903, to Dec. 31st, 1903.

Name or No. of cow.	Breed.	Live weight.	No. days milking.	Lbs. milk.	Per cent. fat in milk.			Lbs. fat in milk.	Lbs. butter, adding one-sixth to the fat.	Value of fat at 20c and 25c. per lb.	Value of the milk at 4c. a quart.
					Average.	Highest monthly.	Lowest monthly				
1 Molly, 21	Gr. Holstein	1,320	320	10,214	3.5	3.8	3.1	358.27	417.98	76 18	163 42
2 Daisy of R., 41	Holstein	1,010	310	9,450	3.2	3.6	2.8	298.49	348 23	66 77	151 20
3 Beauty of N., 67	"	1,080	312	9,352	3.6	4.8	3.2	330.05	385.05	73 29	149 63
4 Marg. C., 15	"	1,400	294	8.824	3.1	3 6	3.0	279.56	326.15	61 74	141 18
5 Dolly, 17	Gr. Holstein	1,455	309	8,776	3.6	4.2	3.2	303.61	354.21	67 15	140 42
6 Marcena, 38	Holstein	1,025	238	8,162	3.5	4.3	3.0	285.65	333.25	59 00	130 59
7 20	Grade	1,160	289	7,383	3.7	4.0	3.4	282.33	329.38	63 09	118 13
8 Lucy, 2	Gr. Holstein	1,090	294	7,352	3.3	3.6	3.0	243.92	284.57	50 48	117 63
9 74	Gr. Holstein	905	243	6,843	3.2	3.5	2.9	217.31	244.47	44 42	109 49
10 Polly, 1	Gr. Holstein	1,160	274	6,807	3.5	3.8	3.2	228.74	266.86	48 13	108 91
11 Mary W., 32	Holstein	1,365	325	6,714	3.3	3.8	3.0	223.75	261.04	49 61	107 42
12 Pan-a-Meg., 85	Holstein	965	325	6,108	3.2	3.5	3.0	198.72	231.84	42 31	97 73
13 53	Gr. Holstein	1,030	263	5,507	4.3	5.1	3.6	220.99	257.82	45 42	88 11
14 76	Holstein	995	259	5,228	3.2	3.6	3.0	169.35	197.67	34 49	83 64
15 Jean, 28	Gr. Ayrshire	1,080	269	5,213	3.9	4.6	3.0	198.84	231.98	41 16	83 41
16 Lily., 26	Jersey	830	309	4.825	4.8	5.2	4.4	227.07	264.91	49 57	77 20
17 Bella, 44	Gr. Ayrshire	1,020	358	4,736	3.7	4.1	3.5	176.53	205.95	38 56	75 78
18 Patti. 30	Ayrshire	930	257	4,735	3.8	4.4	3 6	180.14	210.16	38 56	75 76
19 Glen Bessie, 65	Ayrshire	975	293	4,233	3.8	4.2	3.6	160.98	187.81	33 76	67 73
20 Emerald B., 55	Jersey	950	207	3,775	4.4	4.6	4.2	167.69	188.65	36 87	60 40

Comments on Herd Record.

1. The largest yield of milk (10,214 pounds) and butter (418 pounds) was by a grade Holstein cow of our own breeding. The second, third and fourth largest yields are by pure-bred Holsteins. The cow which stood first during the past two years is sixth on the list this year.

2. Six cows gave yields of over 8,000 pounds milk and over 325 pounds butter during the year. Twelve cows gave over 6,000 pounds milk each. The average for the herd was but 6,711 pounds milk and 276 pounds butter, which was disappointing. It is evident that a number of these cows will have to be sold, as they do not come up to our standard of requirement. Several of them are pure-bred cows. Some, however, are heifers with first and second calves. A few of them will be given another opportunity to see if they can improve their record.

3. The value of the milk fat per cow at the prices which we pay for milk, viz., 25 cents per pound fat for four months of the year (December to March), and 20 cents per pound fat for eight months, ranged from $76.18 to $33.76, and averaged $51.02. The value of the milk at four cents per quart, the price at which we sell milk, ranged from $163.43 to $60.40 per cow, averaging $107.38.

The Farm Department has supplied the dairy cows during the year with pasture, hay, silage, roots, and bedding.

All of which is respectfully submitted,

H. H. DEAN,

Professor of Dairy Husbandry.

PART IX.

THE PROFESSOR OF AGRICULTURE AND FARM SUPERINTENDENT.

To the President of the Ontario Agricultural College :

Sir,—I have the honor to submit herewith my eleventh annual report.

The nature and scope of the work in animal husbandry and agronomy is indicated by the College circular, and requires no extended notice here. Prof. Cumming has shared the work with me, and the ground has been covered as fully as the time allotted to these subjects permits, though more time could be used to advantage in some branches.

The special two weeks' course in stock judging proved very popular again this year, and some new features were introduced, notably the slaughter test in the case of fat steers, which were first judged alive by the class. In March a second two weeks' course in stock judging was conducted for the benefit of farmers' institute workers, and those who acts as judges on the fall fair circuits.

Unfortunately, the object of the short course has been misunderstood by many people who should know better. It has been stated that we took in all applicants, and pretended to turn them out expert judges after a two weeks' course of training. Nothing, of course, could be wider of the mark; and perhaps it may not be out of place to state the two main objects of the short course, so far as live stock is concerned. They are as follows : 1st. To give those who have had little or no experience in judging a foundation upon which to build in the future. 2nd. To enable those who are already more or less proficient in judging to compare notes with other equally good or better judges, and thus tend to bring about more uniformity in methods of judging, and promote harmony of views as to what constitute desirable and undesirable types.

Farm Superintendence.

This department of my work requires a large share of my time, and sometimes scarcely receives the attention which it should, owing to the demands made by other work. Following are notes on the principal crops grown during the past year :

Meadow. We had 85 acres of hay, which yielded about two tons per acre. Most of the hay was harvested in very good condition, though some was damaged by rain. This in the second year we have used the side delivery rake and hay loader, and we are well satisfied with the method.

Our method of treating the hay varies with the weather and the kind and weight of the crops. Heavy, sappy clover is usually cut in the morning, tedded during the afternoon, raked with the side delivery rake during the next forenoon after the dew is off, and drawn in during the afternoon. Later in the season, when the clover is not so sappy, or in the case of a comparatively light crop, the tedder is not used, the side delivery rake answering the purpose. In the case of timothy, we frequently draw what is cut in the morning during the afternoon of the same day. This is done, however, only under the most favorable conditions for rapid drying. We aim to use the tedder as little as possible, though its use is often necessary in the early part of haying, or when a heavy rain has fallen upon the hay as it lies in the swath. The side delivery rake turns the swaths practically upside down, and leaves the hay in light, loose windrows, which dry out rapidly. We think, also, that the rake does not break so many leaves off the hay as does the tedder, and, therefore, we try to make the rake take the place of the tedder as far as possible. I may add that I would not care to use a hayloader without the side delivery rake.

As to our method of making hay, I am aware that there are many who believe that the only way to make good hay is first to put it up in cocks. While I am ready to admit that the method of cocking hay may give a somewhat better quality than the one we practice, at the same time we can make good hay by our method, and we believe that the immense saving in labor effected thereby far more than compensates for any slight superiority in quality obtained through the older method.

Barley. Twenty acres Mandscheuri variety. Sown April 11th at the rate of 1 1-2 bushels per acre. Commenced cutting July 24th. The crop is not all threshed at the time of writing, but it will yield about 50 bushels per acre.

Cultivation for Barley. Fifteen acres had been under roots and five acres under corn the previous year. The root ground was ribbed up with the double mouldboard plow the previous fall. The corn ground was gang-plowed lightly in the fall, harrowed, and ribbed up. In the spring the ribs were harrowed, then cultivated with the spring tooth cultivator, harrowed again, sown with the drill, and finally gone over with a Breed weeder. The field was rolled after the barley was up. The barley was seeded with red clover and timothy, at the rate of about 8 1-2 pounds red clover and 3 1-2 pounds timothy per acre.

Oats. About 96 acres of the Siberian variety. Sowing commenced April 18th, and cutting August 10th. Sown at the rate of 1 1-2 bushels per acre. The oats were seeded with timothy and clover, as described under barley, except about thirty acres which were sown on fall plowed sod in another section. The growth of straw this year was enormous; and as the crop lodged badly, cutting was rendered very tedious, and this, combined with wet weather, made the completion of the harvest later than it has been for twelve years. Though not all threshed, the yield may be safely estimated at 65 to 70 bushels per acre. Had the crop stood up better, the yield would have been much greater.

Cultivation for Oats. Our oats this year followed potatoes, corn, grass peas, oats, and sod. Sowing oats after oats does not look like a good rotation; but we have been compelled to do this after dropping peas out of the rotation on account of the weevil. Our land, however, is rich enough to grow two crops of oats without injury, and the heaviest straw we had was on the part where the oats followed oats. The potato and corn ground was treated the same as the root and corn ground for barley. The pea and oat stubble was fall-plowed, and in the spring worked down with harrow and spring tooth cultivator into a fine seed bed. The sod was plowed about four inches deep early in September, rolled, harrowed, and subsequently cultivated, so that the sod was fairly well rotted in the fall. The spring cultivation was practically the same as for barley. We have no trouble with the wire worm nor white grub, which is probably due to the fact that our sod is not allowed to stand more than two years.

Winter Wheat. Seven and one-half acres of Dawson's Golden Chaff. It was sown September 6th at the rate of 1 1-2 bushels per acre, and was cut July 22nd. The yield was about 35 bushels per acre. Between 3 and 4 pounds of timothy seed per acre were sown with the wheat, and 8 pounds per acre of red clover seed were sown in March before the frost was out of the ground.

Cultivation for Wheat. Winter wheat followed grass peas, which are rather late in maturing to precede wheat, as not enough time is allowed to get the ground in the best condition for sowing. The land was plowed lightly as soon as the peas were removed, and subsequently worked down with the harrow and cultivator into as fine tilth as possible.

Mangels. Ten acres of Giant Yellow Intermediate. Sown May 9th, in rows thirty inches apart, at the rate of four pounds of seed per acre. Germination was rather unsatisfactory, owing to the dry weather which prevailed during May. The yield was about 600 bushels per acre.

Cultivation for Mangels. Mangels followed sod, which was plowed about four inches deep during the latter part of August and the beginning of September. The ground

was rolled and harrowed after plowing, and later was thoroughly cultivated with the spring tooth cultivator. Manure was applied during the winter at the rate of about 15 tons per acre. In the spring the ground was gang-plowed, harrowed, rolled, gone over with the grubber both ways to thoroughly loosen the lower soil, harrowed, rolled again, and ribbed with the double mouldboard plow for sowing. After sowing the roller was passed over the drills.

Potatoes. Eight acres Empire State. Planting commenced May 13th. Seed potatoes were cut with, at least, two strong buds on each piece, and dusted with land plaster. The crop was sprayed twice with Paris green and Bordeaux mixture. Some early blight appeared in August, but there was very little rot. The yield was a little over 235 bushels per acre, which is a very satisfactory average for an eight-acre plot.

Cultivation for Potatoes. Potatoes followed sod, and fall cultivation was the same as for mangels, except that manure was applied in the fall, and the ground ribbed up with double-mouldboard plows. In the spring, the ground was harrowed down, gang-plowed, grubbed both ways, harrowed, and rolled. Then the double-mouldboard plow was used to open up furrows 30 inches apart, and the potatoes were planted 12 inches apart in the rows. The drills were then split, covering the potatoes. We find that it is important to plant the potatoes immediately after the furrow is opened up, and to cover as soon as possible after planting. After the ground had settled, it was harrowed at intervals until after the potatoes were well above ground. The harrowing checked weeds, and prevented the formation of a crust. It also levelled the ridges. Subsequent tillage was with the horse-hoe, or scuffler. When the plants had attained their growth, a little earth was thrown around them by means of mouldboards attached to the scuffler. This was done to prevent exposure of the tubers to the sun.

Corn. Thirty acres Wisconsin Earliest White Dent. Planted in hills 42 inches apart. Planting commenced May 18th. The cold season affected the crop unfavorably, and the yield would not be more than 12 tons per acre.

Live Stock.

Cattle. Our stock of cattle in the Farm Department comprise the following :

Shorthorn.—1 bull, 6 cows, 1 two-year-old heifer, 2 yearling heifers, and 3 calves.

Hereford.—1 bull, 3 cows, 1 yearling heifer, and 2 calves.

Aberdeen-Angus.—1 bull, 2 cows, 2 two-year-old heifers, 1 yearling heifer, 1 calf.

Galloway.—2 cows, 1 yearling heifer, and 1 calf.

Ayrshire.—1 bull.

Jersey.—1 bull.

Sheep.—Small flocks of Leicesters, Oxfords, and Shropshires are maintained.

Swine.—We have a very good herd of Yorkshires, keeping, as a rule, from eight to ten breeding sows. We also keep three or four Tamworth sows, and about the same of Berkshires. We have been led to increase the number of Yorkshires by the greater inquiry for this breed.

It is my wish to improve the quality of the stock kept upon the College farm. Something has been accomplished along this line during the past year, but much remains to be done, and I am asking for a considerable increase in the appropriation for the purchase of stock.

Notes on Feeding Stock.

Our methods of feeding vary somewhat according to circumstances. As a rule, our bulky food for steers, cows, and young stock, except calves, consists of silage, pulped roots, and cut hay, mixed a day in advance of feeding. This winter, however, we are using oat straw instead of hay, straw being plentiful, and hay somewhat scarce. Calves are fed clover hay and roots, with a very small allowance of silage to the older ones. The bulls get hay and roots, also, but, as a rule, are fed no silage. Our standard

meal ration for breeding stock is oats and bran, the quantity being regulated to meet what we consider the requirements of the case. Calves receive in addition, a small allowance of oil cake. Steers are fed almost any available meal mixture. When we can buy corn at a reasonable price, we use it quite largely. When corn is not available, we use oats and barley, or oats, barley, and wheat. Steers which are to be kept until May or June, get practically no meal before the middle of December, and are then started on 4 or 5 pounds each per day. The quantity is gradually increased, and for the whole feeding period, the average amount of meal is about half a pound per day for every 100 pounds live weight of the steers. Short keep steers, or those intended for February or March shipment, are fed more heavily, commencing with about half a pound of meal per day for 100 pounds of their live weight, and gradually increasing, though we rarely exceed a pound of meal per day for 100 pounds live weight of the steers.

In winter, the sheep subsist mainly upon mixed clover and timothy hay and roots, about 4 pounds of roots being allowed for each ewe. Lambs are fed oats and bran, and usually a little oil cake, and the ewes are also generally fed a small allowance of oats and bran for a month before lambing.

For feeding and management of swine, see bulletin on "Bacon Production" prepared by this department. (Apply to Department of Agriculture, Toronto).

Live Stock Experiments.

Our work with steers consisted of a comparison of the relative economy of feeding long keep and short keep steers; of cutting hay and pulping roots for steers as compared with feeding long hay and whole roots; and also of feeding blood meal along with corn meal in order to give a narrower nutritive ratio.

The experiment with long keep and short keep steers is somewhat similar to our previous work with light and heavy meal rations for fattening steers, but, instead of selecting steers of the same quality, we selected the heavier and fleshier steers for the short keep group, and aimed to force them along so as to be ready for market not later than March, whereas the lighter and thinner steers were selected for the long keep group, and fed with the object of marketing in May, or thereabout. This is the second experiment of this series, and we regard the problem under consideration as a very important one, and intend to continue our experiments until we feel we have obtained reliable information.

In swine, we are continuing our work in connection with the influence of different foods and methods of management upon the quality of bacon. A full account of the last year's work with cattle and swine will be found in the report of the Lecturer in Agriculture.

Outside Work.

As usual, I have received during the past year quite a large number of requests to attend meetings of Farmers' Institutes, and similar conventions. So far as possible, these requests have been complied with, though a number have had to be refused on account of the College work. I am of opinion, however, that it would be better for the College, and for my own department especially, were it possible for me to meet with the farmers of the country oftener than present arrangements permit. The business of the Farm Department, the general oversight and planning of live stock experiments, and various other matters, make it difficult to give that attention to lectures which they should receive, and I believe the time has come when a readjustment of the work of the department would be in the best interests of the institution.

I have the honor to be

Your obedient servant,

G. E. DAY,

Professor of Agriculture.

PART X.

THE LECTURER IN AGRICULTURE.

To the President of the Ontario Agricultural College :

Sir,—I have the honor to submit herewith a brief report of my second years' work as Lecturer in Agriculture.

Teaching.

In the report of the Professor of Agriculture reference is made to the nature and scope of my work as Lecturer in Agriculture, and little further need be added here, unless it is to call your attention to one particularly promising line of work which is carried on, for the most part under my direction, with the senior students. For the greater part of the fall term, and a considerable part of the winter term, it is a very pleasant part of my work to take the senior students, some two or three times a week, to the farms of the leading live stock men within convenient access of the College, and there, with the assistance of some of the breeders, give them practical instruction in the care, management, and judging of all classes of live stock. I have found these live stock men, without exception, most courteous and ready to give our students every opportunity to observe and learn what they can of their methods. I take this opportunity of expressing our high appreciation of the readiness with which these farmers have given their time and assistance to this very important line of work.

Teaching occupies the major part of my time ; but, in addition, I have as far as possible complied with requests to meet with the farmers of Ontario, especially at the exhibitions and fairs, at fifteen of which I have acted as judge during the past fall.

I have also endeavored to assist the Professor of Agriculture, whenever possible, but especially in keeping an oversight of the experimental feeding work, of which a report is given below.

Experiments with Swine.

Owing to the very unfortunate outbreak of contagious pneumonia, to which reference was made in the last year's report, it was deemed inadvisable to conduct any winter experiments with hogs. As a result, the number of experiments conducted with hogs was somewhat limited. They are given below :

Blood Meal and Tankage as compared with Skim-Milk for Hogs.

During the past year, several articles have appeared in the agricultural press deploring the fact that almost all the blood meal and tankage from Canadian packing houses is sold to firms in the United States to be used as commercial fertilizers. It has been pointed out that, in this way, our farms are being drained of a large amount of fertility which ought to be conserved. Most of the writers of the articles, that have, so far, appeared, recommend that these by-products be bought by Canadian farmers and applied by them to the land. The experiment described below indicates that these by-products, when properly prepared, can be still more advantageously used by being fed on the farm and thus a profit be made not only from the feed, but also from the manure of the animals fed.

For the purpose of the experiment, we were supplied with blood meal by the Wm. Davies Company, Toronto, and with blood meal and tankage by Swift & Company, Chicago. The blood meal and tankage from the latter firm is specially prepared for

animal food purposes, and is very much finer in texture and freer from foreign matter than the ordinary commercial by-products of the slaughter house used for fertilizing purposes, such as were supplied by the Toronto firm. The Swift people have a special plant for refining these by-products, and, although this adds considerably to the price of the blood meal and tankage, yet our experiments indicate that the refining process is absolutely necessary. The ordinary commercial blood meal proved unpalatable, and it was found impracticable to continue the experiment with it. Should there, however, arise a demand for these by-products in Canada, we feel sure that our Canadian firms would supply the refined product.

Blood meal, as the term indicates, is dried blood, reduced to meal. The guaranteed analysis of that supplied by Swift is 87 per cent. protein, 3 per cent. ash, 10 per cent. moisture.

Tankage is a prepared product from refuse meat, entrails, and other offal that accumulates in the slaughter house. The guaranteed analysis of that supplied by Swift is 60 per cent. protein, 6 per cent. ash, 10 per cent. moisture.

In this experiment, there were seven groups of pigs—five in each group. The pigs in five of the groups averaged in weight about 33 pounds each. Those in the remaining two groups averaged about 21 pounds each. The bulk of the ration fed to all the hogs was the same, consisting at first of pure middlings, but with a gradually increasing amount of barley, until at last barley was the sole grain food.

The following table shows the ration fed each group :

Group 1.—Meal and blood meal.
Group 2.—Meal and tankage.
Group 3.—(Light weight) Meal and tankage.
Group 4.—Meal and skim-milk.
Group 5.—(Light weight) Meal and skim-milk.
Group 6.—Meal, blood meal, and skim-milk.
Group 7.—Meal, tankage, and skim-milk.

It had been planned to have a light weight group also fed on meal and blood meal ; but the pigs selected for this group were, unavoidably, runts, and, proving inferior feeders, had to be left out of the experiment.

For the first four weeks, the pigs were fed blood meal or tankage in the proportion of 1 to 6—each pig receiving exactly 3-10 of a pound of blood meal or tankage per day. Owing to the limited amount available for the experiment, we were not able to increase the weight of blood meal or tankage ; so the average proportion throughout the experiment was about 1 to 13 of meal.

The light weight pigs were fed about three-fourths as much of these by-products as the others, averaging one-fifth of a pound per day each, and a proportion throughout the experiment of about 1 to 18.

Those pigs getting milk were fed in the proportion of about 2 of milk to 1 of meal throughout the whole experiment, getting at first about 2 pounds of milk each per day and at the last about 10 pounds of milk each per day.

The remaining two groups, which received part milk and part of either blood meal or tankage, received half as much of the by-products as the light weight hogs, and in addition 1 1-4 pounds of milk each per day throughout the experiment.

The blood meal, or tankage, or milk, was mixed with the middlings and barley and the pigs were fed as much as they would eat up clean twice a day. In addition, they were fed at noon a large-sized handful per pen of grass, or clover, or green oats, or rape, all of which were conveniently near the piggery. As the amount of this fed per day was so inconsiderable, no account was kept of it. At the same time, we have found that even a very little green feed fed regularly, as above mentioned, is a most beneficial thing for pigs. The pigs were fed in rather small pens with small outyards ; and during the latter part of the experiment they were cramped for room.

In the table presented below are given, in addition to other material, the gains in weight and the cost of producing 100 pounds of gain. In estimating the cost, meal is valued at $20 per ton, tankage at $33 per ton, blood meal at $55 per ton, and milk at 10 cents per hundred weight.

Group.	Gain.	Food consumed.	Food consumed for 100 lbs. gain.	Cost of 100 lbs. gain.
				$ c.
1	817 lbs....	2,884 lbs. meal ; 227 lbs. blood meal..	353 meal ; 27.78 blood meal..... ..	4 29
2	790 "	3,015 " ; 227 lbs. tankage....	381.64 meal ; 28.73 tankage.....	4 29
3	716 "	2,680 " ; 147 "	374 3 " ; 20.53 "	4 08
4	712 "	3,266 " ; 5,804 lbs. milk.....	458.7 " ; 815.16 milk.....	5 40
5	744 "	3,014 " ; 5,465 lbs. milk	405.1 " ; 734.54 milk..	4 78
6	695 "	3,049 " ; 1,011 lbs. milk and 75 lbs. blood meal.....	438.7 " ; 144 milk;10 79 bld. meal	4 87
7	800 "	3,190 lbs. meal ; 984 lbs. milk and 75 lbs. tankage	398.75 " ; 123 milk ; 9 87 tankage.	4 87

Notes on the Above Table.

1. This is but a single experiment, and will have to be repeated several times before any reliable results can be announced ; and it must, therefore, be understood that the comments made below apply only to the pigs fed in this experiment.

2. Those pigs fed blood meal or tankage produced gains more cheaply and at a less consumption of meal (middlings and barley) per 100 pounds than the ones fed skim-milk.

3. In group 6 (pigs fed meal, skim-milk, and blood meal) were two short, chubby pigs that were really finished some time before the conclusion of the experiment, a fact which accounts, in a measure, for the somewhat higher cost of feeding this group than group 7 (pigs fed meal, skim-milk, and tankage).

4. Even the small amount of blood meal or tankage fed along with skim-milk to groups 6 and 7 seemed to have a very beneficial effect.

5. The pigs, without exception, took to the blood meal and tankage from the very first with great avidity.

6. There is nothing in this experiment to indicate which is the more valuable food, blood meal or tankage.

7. In both cases where light weight pigs were fed in comparison with heavier pigs, cheaper gains were made by the former.

8. The duration of the experiment was 137 days, and the average gain per hog from beginning to end was 1 1-10 pounds per day.

On November 3rd all the hogs fed in this experiment were delivered to the Wm. Davies Company, Toronto, where the sides were marked, and carefully examined after they came out of the salt some three weeks later. Below is the report upon the sides :

"In regard to the shipment of hogs which you asked us to follow through the salt, we have only a meagre report to make, but that is eminently satisfactory, so far as the quality of bacon is concerned. Out of the whole shipment there was not a single hog which did not yield firm bacon which was graded by our inspector as 'best !' "

In conclusion : Blood meal and tankage have proven themselves fully equal to skim-milk for the production of firm bacon, and, so far as this experiment is concerned, have produced cheaper gains.

Even the small amount of green feed fed at noon seems to have been most beneficial.

Feeding Pigs Three Times per Day.

In the opening paragraph of this report upon hogs, it is stated that an attempt was made to feed the ordinary commercial blood meal to hogs. Two pens of five pigs each were used for this purpose. From the first these pigs showed their aversion to the food and after a three weeks' trial it had to be dropped. Two weeks later, when these pigs had come around to their normal condition and averaged in weight about 50 pounds each, they were fed a grain and skim-milk ration three times per day. One pig, for which the previous ration had proved too much, had to be left out, so that there were 9 pigs in the experiment. The feeding period for these pigs from this date was 101 days. The table below indicates the gains, food consumed, and cost of gains.

Gain.	Food consumed.	Food for 100 lbs. gain.	Cost of 100 lbs. gain.
1,224 lbs...	5,278 meal ; 11,094 skim milk.....	431 2 meal ; 906.3 skim milk.....	$ c. 5 21

Notes.

1. These pigs made slightly more rapid gains than any of the others. Although they were considerably below the others at the beginning, due to the unpalatable food at first fed them, yet, in the end, they were rather heavier than any of the others. They averaged a gain of 1 1-3 pounds each per day.

2. They consumed about the same amount of food per 100 pounds gain as groups 4 and 5, which were fed upon the same food.

3. However, judging from this experiment alone, we note that the extra gain was not sufficient to pay for the extra labor of feeding.

4. We purpose experimenting along this line next year with younger pigs and perhaps the results may be different.

5. From this experiment it is evident that where gains alone, irrespective of cost, are aimed at, as in the case of some "show stock," feeding three times a day or possibly more is good practice.

Short Keep vs. Long Keep Steers.

In the winter of 1901-1902, an experiment was conducted, with a view to determining the relative profits from buying moderately heavy fleshy steers which can be made ready for export by February or March, or from buying lighter, thinner steers which must be kept until May or June. The short keep steer costs more per pound than the thinner steer ; but, on the other hand, we have less labor and quicker returns in his favor. This line of experimental work has been continued during the past year, with a view to determining the reliability of the previous experiment, and below will be found a statement indicating the relative amounts of food required for, and the cost of, producing one hundred pounds gain in each case. The questions of market and labor will be left out of consideration at present.

Of the 16 steers used for experimental purposes, 8 of the larger and fleshier steers were selected to represent short keep animals, and were fed with the object of having them ready for market not later than March ; and the remaining 8 were fed with the object of marketing in May or June.

The short keep steers had to be fed a heavier meal-ration than the long keep steers in order to get them ready for market in time. The weights and average meal rations of the two groups were as follows :

Group.	Average weight at beginning.	Average weight at conclusion.	Average meal ration per day.	Amount meal fed per 100 lbs. average live weight.
Long-keep	1,098 lbs	1,445 lbs	6.6 lbs.	.52 lbs.
Short-keep	1,271 "	1,513 "	11.23 lbs.	.81 "

The long-keep steers were fed from November 29th to May 9th, or 160 days. The short-keep steers were fed from November 29th to March 26th, or 117 days.

The gains and food consumed for, and also cost of, 100 pounds gain are given below. In estimating the cost the following valuations have been employed : Meal, $20 per ton; hay, $8.00 per ton; and roots, $2.00 per ton.—all of which may be considered fairly high valuations.

Group.	Average gain per steer.	Average daily gain per steer.	Food consumed per 100 lbs. gain.	Cost of 100 lbs. gain.
				$ c.
Long-keep 160 days	347 lbs.	2 16 lbs	316 lbs. meal, 1,265 lbs. hay, and 2,316 lbs. roots	10 53
Short-keep 117 days	244 "	2.08 "	539 lbs. meal, 122 lbs. hay, and 2,480 lbs. roots	12 75

Notes.

1. The above figures do not represent the actual cost of feeding this bunch of steers, as they were allowed to run some two months upon a rape and grass pasture before being taken into the stables, during which time they made large gains very cheaply, and, were this taken into consideration, the cost of producing 100 pounds gain would be very much lowered.

2. It required about 200 pounds more meal for 100 pounds gain in the case of the short-keep steers than in the case of the long-keep steers.

3. Every pound of gain in live weight costs more to produce than it will sell for on the market. Any profit in feeding must come from increasing the value of the carcass purchased in the beginning. Therefore, the steer which requires to be increased in weight only 200 pounds in order to be fit for market, is worth considerably more per pound than the steer which requires to be increased 300 pounds. In this experiment, all the steers were sold at 5 cents per pound. In order to be paid for the food consumed at the valuation given above, we should have paid only $3.25 per cwt. for the long-keep steers, whereas we could have paid $3.50 per cwt. for the short-keep steers and realized the same values for the foods used.

Cut Feed vs. Uncut Feed.

The question is frequently asked : Does it pay to cut hay and roots ? In our ordinary feeding we believe it does, because the cutting of feed enables us to mix in the ration straw, chaff, and inferior hay in a way that makes these palatable to the cattle. However, in feeding the above steers, hay and roots were the only roughage used, and both were of good average quality, so the opportunity was taken to determine, so far as this bunch of cattle was concerned, the relative gains from feeding good hay or roots whole or cut. Half of the long-keep and half of the short-keep steers were fed uncut hay and whole roots. The other half of each group were fed cut hay and pulped roots. The experiment was continued up to March 26th (119 days), when the short-keep steers were disposed of.

In the table below are given the gains made, the food consumed for 100 pounds gain, and the cost of producing 100 pounds gain under each system of feeding :

Group fed.	Average gain.	Average daily gain.	Feed for 100 lbs gain.	Cost of 100 lbs. gain.
	lbs.	lbs.		$ c.
Cut feed	242.5	2.04	416 lbs. meal, 1,112 lbs. hay and 2.224 lbs. roots.	10 82
Uncut feed	257	2.16	397 lbs. meal. 1,255 lbs. hay and 2,549 lbs. roots.	11 54

Notes.

1. Making no allowance for the cost of cutting hay and pulping roots, 100 pounds gain were produced at a cost, for food material, of 72 cents less in the case of using cut feed than in the case of using uncut feed.

2. The steers fed cut feed averaged in weight at the conclusion of the experiment 1.388 pounds, of which 242.5 pounds cost, as stated in note (1), 72 cents per 100 pounds less to produce. From this it is evident by a simple calculation that were steers generally selling at $5 per hundred weight, these steers could have been sold with as much profit at $4.87.

3. It will depend much upon circumstances, other work that could be done, etc., whether this is sufficient margin to pay for cutting hay and pulping roots.

Blood Meal to Narrow a Nutritive Rati .

In our account of experiments with hogs will be found a statement showing the high value of blood meal as a feed for hogs. A further test was made with blood meal by feeding it to steers in addition to their ordinary meal ration of corn meal, oats, and barley, with a view to determining the economy of narrowing the nutritive ratio by its use.

Steers averaging about 1,250 pounds, and that had already been fed about two months upon 6 to 8 pounds of meal, were divided into two groups of 8 each, one group being fed as before and the other getting in addition about 1 1-5 pounds per day each of blood meal. The experiment continued 63 days.

The following table shows the feed consumed and gains made :

Group.	Gain	Feed consumed.	Feed for 100 lbs. gain.
	lbs.		
Fed blood meal	1,085	4,650 lbs. meal, 590 lbs. blood meal, 13,880 lbs. hay and 27,996 lbs. roots.	429 lbs. meal, 54 lbs. blood meal, 1,279 lbs. hay, and 2,580 lbs. roots.
Fed without blood meal	1,070	4,739 lbs. meal, 14,453 lbs. hay and 28,890 lbs. roots.	443 lbs. meal, 1,350 lbs. hay and 2,700 lbs. root.

Notes.

1. The steers getting blood and meal made slightly better gains than the others, and consumed a little less meal, hay, and roots per 100 pounds gain.

2. However, valuing the standard foods as above and blood meal at $33 per ton, it cost 34 cents more for a hundred weight of gain in the case of the steers fed blood meal and those not fed blood meal.

3. This is scarcely a fair test for blood meal as a food for cattle, as its greatest value no doubt is with young, growing cattle that need protein for developing muscle. Moreover, the results are in accord with our previous experiments, which have gone to show that light meal rations are more economical than heavier meal rations.

The Feeding of Range Steers.

Those who were in attendance at the Winter Fair of 1902 will remember a bunch of range steers that were on exhibition at the fair. In order to determine the profit from feeding this class of cattle, we fed nine of them at the experimental department. Two pens were arranged and the steers were fed loose in these pens from December 28th to May 24th, 147 days. During the last 6 weeks they were allowed the run of a small yard, into which they could go at liberty. The steers averaged in weight at the beginning of the experiment 980 pounds, and when finished weighed an average of 1,205 pounds.

The table below gives the total gain of the 9 steers, the average daily gain per steer, the food consumed during the whole feeding period, and the amount of food and cost of food to produce 100 pounds gain:

Total gain.	Average daily gain per steer.	Total feed consumed.	Feed consumed per 100 lbs. gain.	Cost of 100 lbs. gain.
lbs.	lbs.			$ c.
2,025	1.53	10,952 lbs. meal, 55,694 lbs. roots, 37,550 lbs. hay.	541.8 lbs. grain, 2,750 lbs. roots, 1,850 lbs. hay.	15 56

Notes.

1. So far as this experiment is concerned, it is evident that unless they could be bought at a very low rate, it would not pay to feed such steers as those experimented upon.

2. At the same time, it is worth noting that these steers made much better gains during the period they were allowed the run of a yard than when they were confined in their pens. Feeding in corrals is the system practised in the west, and it would appear that a similar system would have to be adopted in order to feed these steers successfully in Ontario.

Conclusion.

We hope that, in the near future, our facilities for conducting experimental work along live stock lines may be increased so that, not only more experiments may be conducted, but those that are conducted may be on a somewhat larger scale. We would also like to see arrangements made for extending this work outside of the College and for conducting experiments in the stables of some of our best feeders of live stock, so as not only to give corroboration to the work conducted at the College, but encourage the spirit of investigation to a greater extent among the practical feeders and breeders of the Province.

Respectfully submitted,

M. CUMMING,

Lecturer in Agriculture.

PART XI.

THE PROFESSOR OF HORTICULTURE.

To the President of the Ontario Agricultural College:

Sir,—I have the honor of presenting herewith my eleventh annual report on the work of the Horticultural Department.

In reviewing what has been accomplished during the year, I am pleased to state that steady progress has been made in nearly all lines of our work. While this is gratifying, yet we do not rest satisfied with present attainments, for this would put an end to all progress. Horticulture presents such an unlimited field for the work of investigation and of instruction that we feel we have made only a beginning, and that we would like to enlist all the help possible in a work which is at once pleasant and profitable.

Instruction of Students.

At an institution of this kind, which is both a College and an Experimental Station, our work must necessarily be of a twofold nature—that of education and that of investigation. For eight months of the year we are engaged the most of our time in the instruction of students, the other four months, with whatever time can be taken during the College sessions, is devoted to investigation work. Hence the College instructor naturally looks for his greatest results in what he spends most time upon,—his students. Our classes, both regular and special, are increasing yearly, and they necessarily require more of our attention. A comparison of our last year's time table with that of ten years ago, shows that we are now giving ten times the time to horticulture on our College curriculum that we did then.

As a full outline of the course in horticulture is given in the College circular, and reference has been made to special features of it at various times in our annual report, we need make no further reference to it here, except to say that we are endeavoring to make the course as practical as possible and more and more complete, and we look for the results among our ex-students throughout the country, in better managed orchards, more numerous and better tilled vegetable gardens, more beautiful country homes, more farm windbreaks and carefully managed wood lots, and more useful and intelligent members of the community generally.

Correspondence.

One of the signs of growing confidence in the work of the College, is the ever increasing number of letters sent in, asking for all kinds of information. Nearly every mail brings letters enquiring about the best varieties of fruit to plant; the best time and method of pruning; what spraying mixtures to use; and a hundred and one other such questions relating to all kinds of horticultural work. About a thousand letters have been written during the year answering such questions.

Meetings Attended.

During the year I attended and took part in the programme at the following public meetings:

Seven meetings of the Guelph Horticultural Society and addresses on various horticultural topics.

The Hamilton Horticultural Society, address on "The Growth and Development of Fruiting Branches."

Central Exhibition at Guelph, judging display of fruits.

Northern Model Fair at Walkerton, address and judging display of fruits.

Centre Wellington and Nichol Agricultural Societies at Fergus, judging Horticultural display.

North Waterloo Agricultural and Horticultural Exhibition at Berlin, judging display of fruits.

Niagara County, N.Y., Farmers' Club, address on "The Work of the Ontario Agricultural College, and Improved Methods of Fruit Growing."

The St. Joseph Island, Farmers' Institute at Hilton, address on "The Possibilities of Fruit Growing on the Island."

Ontario Fruit Growers' Association at Leamington, address on "The Beautifying of Home Grounds," and report on "New Fruits."

Convention of Agricultural Colleges and Experiment Stations at Washington, D.C., address on "Practical Instruction in Horticulture."

Ontario Agricultural and Experimental Union at Guelph: Report on co-operative testing of small fruits and report as Treasurer of the Experimental Union.

Reports and Articles Published.

For the Fruit Experiment Station Report I prepared a report on my annual inspection of the stations.

For the Ontario Fruit Growers' Report I prepared a report on the new and seedling fruits of the year, and a paper on the "Beautifying of Country Homes."

For the Experimental Union Report I prepared a report on our co-operative testing of small fruits throughout the Province.

For the Canadian Horticulturist I prepared articles on: "The Cold-Storage of Fruits"; "The Preservation of Fruits for Exhibition Purposes"; "Notes on Fruit Growing in the North"; "Growing Rhubarb in the Cellar in Winter"; and answers to numerous questions of correspondents.

Inspection of Fruit Experiment Stations.

The fourteen Fruit Experiment Stations, located in as many different parts of the Province, are under the joint control of the College and the Fruit Growers' Association. As Official Inspector, it is my duty to inspect each of these stations and to report upon the same to the Board of Control. Each was visited at the most opportune time throughout the summer to take note of the fruits under test, and a number of photographs were taken which will be useful in illustrating the reports of the experimenters. For a fuller account of this work I may refer to the annual report of the stations.

Co-operative Testing of Small Fruits.

For the past ten years we have been carrying on a series of co-operative experiments with small fruits. This work was begun on a small scale, but it has steadily increased until we now have on our books the names of about 1,300 experimenters who have engaged in this testing.

The following is the list of plants offered for testing last spring:

I. Strawberries—Clyde, Tennessee Prolific, Irene and Van Deman—12 plants of each.

II. Raspberries—Cuthbert, Golden Queen, Marlboro', and Columbian—6 plants of each.

III. Black Raspberries—Gregg, Kansas, Palmer, and Souhegan—6 plants of each.

IV. Blackberries—Agawam, Gainor, Kittatinny, and Snyder—6 plants of each.

V. Currants—Fay, Raby Castle, Victoria, and White Grape—2 plants of each.

VI. Black Currants—Champion, Lees, Naples, and Black Victoria—2 plants of each.

VII. Gooseberries—Downing, Pearl, Red Jacket, and Whitesmith—2 plants of each.

The varieties selected are those which have been found by repeated tests at the College and at the Fruit Experiment Stations to be among the best to give a long season of fruiting from early to late.

The number of plants for each experiment is just enough to afford a comparison of the varieties, and gives the experimenter a start if he wishes to propagate more. The number may seem small, but when we take into account what is sent out each year, it is surprising how fast these figures count up. During the past ten years we have distributed throughout the Province 344 black currant bushes, 3,066 red and white currant bushes, 3,908 gooseberry bushes, 5,396 blackberry bushes, 6,648 red and white raspberry bushes, 6,744 black raspberry bushes 37,584 strawberry plants, making a total of 63,690 plants.

For a fuller report on this work the reader is referred to the Report of the Experimental Union.

Experimental Work at the College.

The extensive variety tests which we have been conducting for several years past with strawberries, raspberries, blackberries, currants, gooseberries, and tomatoes were continued again this year.

Tests have also been under way for some time with the larger fruits, such as apples, pears, plums, peaches, cherries, quinces, and grapes. A new experiment was begun on a large scale with orchard cover crops, and in conjunction with the Department of Physics, the experiments begun last year with fruits in cold-storage were continued this year in our own cold-storage plant on a much larger scale.

Orchard Cover Crops.

The following report on an experiment with orchard cover crops is presented by H. S. Peart, B.S.A., assistant in this department, who carried out the details of the experiment :

During the past season a number of cover crops for orchard purposes have been tried. A brief account of the growth of these is here given :

In the spring, as soon as dry enough to permit, the ground was plowed about four or five inches deep. Cultivation was begun immediately, and the whole ground gone over every week or ten days, depending somewhat on the weather, until the end of July. The thorough cultivation kept the ground fairly free from weeds, and tended to conserve soil moisture. On July 31st the seed for the following crops was sown and covered with a light harrow :

The seed germinated quite readily, and the growth of each was noted during the summer and early autumn. On November 4th, just before the hard freezing weather set in, the growth and condition of each was fully noted.

No. 1. Red Clover. Sown at the rate of 15 pounds per acre formed a mat about 3 inches thick. This is a very fair cover, but would be better if somewhat thicker. Twenty pounds per acre would probably be better.

No. 2. Mammoth Clover. Sown at same rate as red clover. Very little difference could be noted between this and the red clover.

No. 3. Crimson Clover. Sown at the rate of 20 pounds per acre reached a height of about three inches, but did not form so close a mat, and was not so strong as the red or mammoth clover. The seeding was much too thin for the best results. One-half bushel is required for a good cover in this locality.

No. 4. Hairy Vetch. Sown at the rate of 40 pounds per acre formed a low dense mat about two inches high. The low growth of this plant is a decided advantage, as it does not inconvenience fruit pickers in the autumn. It is probable that a somewhat lighter seeding of about 30-35 pounds would give quite as good results.

No. 5. Alfalfa. Sown at the rate of 30 pounds per acre grew to a height of six-seven inches and stood up well, making a good cover. The quantity of seed in this case appears to be about right.

No. 6. Rye. Sown at the rate of 1½ bushels per acre grew to a length of about twenty inches, but went down and formed a mat about six inches thick. This is a very desirable cover. The seeding is about right, although on very strong land, 1¼ bushels should be ample.

No. 7. Rape. Sown at the rate of 10 pounds per acre formed a very rank growth in the low ground, reaching a height of nearly two feet. On the gravelly ridge running through the orchard it was somewhat shorter. Rape is evidently not well adapted to gravelly knolls. The seeding was thicker than necessary, about 8 pounds per acre should on most orchard lands give good results.

No. 8. Hairy Vetch 40 pounds, and Rye 30 pounds, per acre. On the high land the hairy vetch formed a very good cover and was ahead of the rye. On the low ground the vetch was smothered by the rank growth of the rye, which grew 7-8 inches This is not a desirable combination.

No. 9. Hairy Vetch 20 pounds, and Cow Horn Turnip 12 ounces, per acre. The turnips made good roots, and the tops stood about 14 inches, but completely smothered the vetch. The turnips are not so desirable as some of the other crops.

No. 10. Hairy Vetch 20 pounds, Crimson Clover 8 pounds, and Cow Horn Turnips 8½ ounces per acre. The vetch and clover formed an evenly mixed mat about 3 inches high, but was too thin to sufficiently cover the ground. The turnips were somewhat unevenly distributed, and in some places had smothered out the vetch and clover.

No. 11. The same mixture as the preceding, except that no turnips were used. The seeding was rather light. A better stand would have been made if more seed had been used.

No. 12. Hairy Vetch 20 pounds and Red Clover 8 pounds per acre. This formed a very thin, weak cover. The seeding was much too light.

No. 13. Hairy Vetch 20 pounds and Mammoth Clover 8 pounds per acre. Here, again, the seeding was too light for the best results.

No. 14. Rye 1 bushel and Rape 4 pounds per acre. The rape grew to about 20 inches and the rye was almost smothered out.. It is doubtful if any other crop can be successfully used in combination with rape.

No. 15. Alfalfa 15 pounds and Red Clover 8 pounds per acre. This combination appears very satisfactory, the growth was about 8 inches and moderately thick.

No. 16. Alfalfa 15 pounds and Mammoth Clover 8 pounds. The condition was very similar to that of the preceding plot.

No. 17. Alfalfa 15 pounds and Crimson Clover 8 pounds. Much like the preceding plot, except that the alfalfa seemed somewhat too vigorous for the clover.

From the above notes it may be seen that most of these crops will give better results when used alone. When two are used, one almost invariably checks the other, and as a consequence the seed for one of the plants is lost.

These crops will be noted again in the spring, and the condition in which they come through the winter will be reported on later.

Apples.

The past has been on the whole an excellent season for apples. On all of our old trees there was a heavy crop, and in the young orchard set out seven years ago the trees of many varieties are coming into bearing. Thirty-six varieties began bearing last year, and this year there was fruit on fifty-six varieties. Orchard note books have

been prepared in which careful records are being kept of the growth, blooming, and fruiting of every tree in the orchard. This in a few years will give a lot of valuable data. For the present we shall merely mention those varieties which have fruited so far, classifying them according as they bore heavy, medium, or light crops. The varieties which bore for the first time this year are marked with an asterisk.

Those varieties fruiting heavily this year were: Benoni, Duchess, Gano, *North West Greening, Ontario, Peter, *Seek-no-Further, Shackleford, Stark, *Tetofsky, Walbridge, and *Yellow Transparent.

Those which bore a medium crop were: Ben Davis, *Early Harvest, Fallawater, Haas, *Jonathan, Longfield, *McIntosh.

The following bore only a light crop: *Astrachan, Baxter, *Belle de Boskoop, *Belleflower, *Bethel, Cooper's Market, *Fall Sweet, Gideon, *Golden Russett, *Golden Sweet, *Grimes, Hare Pipka, Hubbardston, Hurlburt, Magog, Maiden's Blush, *McMahon, *Pewaukee, *Ribston, *Rhode Island Greening, *Roxbury Russett, *Salome, *Scott's Winter, *Sutton Beauty, Tallman, Trenton, Utter, Wagener, Wealthy, Wellington, *Winter St. Lawrence, and all of the crab apples, viz.: General Grant, Hyslop, Martha, Montreal, Transcendent, and Whitney.

Pears.

We have in our experimental orchard about thirty-three varieties of pears, in all about one hundred and twenty trees. Some varieties have made very fair growth and are doing as well as we could expect in this section, where the winters are rather severe for pears, but others are beginning to show clearly that they lack the vigor and hardiness to stand our climate.

The following varieties bore a light crop this year; those marked with an asterisk fruited also last year: Bartlett, Bessemianka, Doyenne d'ete, *Flemish Beauty, Howell, *Kieffer, Lawrence, *Manning's Elizabeth, and *Seckel.

The following varieties fruited last year, but not this: Easter Beurre, Giffard, Lawrence, and Lincoln.

Plums.

The varieties of plums grown in this country may be grouped under three more or less distinct types: The Americana or Native varieties, many of which have been introduced during the past ten or fifteen years. One of the chief characteristics of this type is their extreme hardiness. They may be grown where the other types will not succeed at all, and apparently do best under such conditions. We have about two dozen of these varieties in our collection, most of the trees of which are young and not yet in bearing.

The following bore a light crop this year: Bender, De Sota, Hawkeye, Stoddard, and Weaver.

The Domestica or European varieties are those which for many years past have been the most extensively grown in this country. They are not nearly so hardy as the native varieties, but are usually considered of better quality, although in this respect as well as in size and color they present a much greater variation. Of this class of plums the Glass, Lombard, and Victoria bore heavily this year. Grand Duke and Gueii bore a medium crop, and the following varieties bore a light crop: Coe's Golden Drop, Field, Monarch, Moore's Arctic, Reine Claude, Shipper's Pride, Smith's Orleans, and Shropshire Damson.

The Japan plums are of a comparatively new type in this country and it was at first supposed they would not be any hardier than the peach, but experience has shown that they are much more hardy than was generally supposed. The Burbank and Abundance, which are the most generally grown varieties of this class, have been fruited here for the past four years, and have been the most vigorous and productive varieties in the orchard.

Cherries.

We have in our experimental orchard about thirty varieties of cherries, in all about one hundred trees.

Those varieties of the Morello type have as a rule made the most satisfactory growth, because of their extreme hardiness.

The following varieties bore fruit this year : Early Richmond, Montmorency, Olevet, and Vladimer.

Many of those of the Heart and Bigarreau type, commonly known as the English cherries, are showing signs of being tender for this section, although the following varieties bore some fruit this year : Black Heart, Governor Wood, Schmidt's Bigarreau, Windsor, and Yellow Spanish.

Another class of cherries,—the Dukes,— which are often classed with the Morellos, are intermediate between the two classes just mentioned, both in habit of growth and hardiness.

The following varieties of this class bore fruit this year : Belle Magnifique, Dyhouse, Empress Eugene, and Late Duke.

Strawberries.

For the past eight years we have been conducting an extensive variety test with strawberries, during which time over 300 varieties have been on trial. Each variety has been given at least five years' trial before it has been discarded, unless it has shown clearly that it was not worthy of so long a trial. A number of the leading varieties have been retained from the beginning which form a standard for the comparison of newer varieties, which are being introduced each year. Fifty new varieties were added to our collection this year. Careful notes have been taken upon the habits of the plants, and the character of the fruit, and every picking has been carefully weighed and recorded. In this way much valuable data has been obtained, and we now have a fairly good idea of the value of a great many varieties grown under our conditions.

Too often the first question asked by the inexperienced grower about strawberries is : "Which is the best variety to plant ?" This is a question too indefinite to be satisfactorily answered, for there are so many desirable characters sought for in a strawberry, and so few varieties that possess more than one or two of them, that we must know first what kind of a berry is particularly desired. If we were asked, which on the whole has been our most productive berry ; our largest berry ; the best table or canning berry ; the earliest or latest berry,—the answer could be given much more satisfactorily.

In the following list a dozen of the most desirable varieties are given which cover the season from early to late :

Early : Splendid, Wesley, Van Deman, and Sadie.

Midseason : Clyde, Warfield, Haverland, Williams, and Tennessee Prolific.

Late : Irene, Saunders, and Buster.

If we were to reduce the above list to four varieties and no collection, either for home use or market, should have less than this, we would select for this section : Splendid, Clyde, Warfield, and Irene. The first two are perfect flowering varieties, while the last two are imperfect.

Raspberries.

Sixty varieties of raspberries have been under test here for several years, and each year careful records have been made of the weight of each picking from each variety. This year the crop was so light and uneven that we found it more practicable to make a general estimate of the relative standing of the varieties than to follow up our practice of weighing. As a result of several years' testing and careful observations the following have proved to be the most satisfactory varieties here :

Red: Cuthbert, Marlboro', and Loudon.
Purple: Columbian.
White: Golden Queen.
Black: Older, Eureka, and Smith's Giant.

Currants

We have now an excellent two-year-old plantation of currants of about seven hundred bushes, in which forty-six varieties—twenty-one red, twenty-two black, and three white—are under test.

All of them bore fruit this year, Red Cross being the heaviest yielding red variety, Black Victoria the heaviest yielding black, and White Grape the most productive white variety.

The Red Cross is a large, showy currant of good quality, and while it may not hold its place over Fay and Cherry and Victoria, which have as a result of the previous tests been the favorites, still it is a very promising variety.

The White Grape has always been our best white currant, and has always been the most productive variety in our whole collection. Black Victoria is a comparatively new variety, but it bids fair to surpass all of the old varieties, such as Champion, Lees, and Naples, which have so long been the standards.

Gooseberries.

We have in our gooseberry plantation forty-five varieties of gooseberries, twelve of which have been under test for seven years. The crop was light this year on all varieties, but the results tend to confirm those already reported for previous years. Pearl and Downing still head the list as the most productive and best all round varieties, and they are so nearly alike that the planter will make no mistake in planting either of them. Red Jacket ranks next for general value. It is not quite so productive as Pearl or Downing, but the fruit is about one-half larger.

All of these are American varieties, and are more or less exempt from the mildew to which the English varieties are so subject.

Tomatoes.

The past two summers have been unusually unfavorable for the ripening of tomatoes. The cool moist weather kept the vines growing vigorously, but they did not mature one-half of the crop, and what crop did ripen lacked the flavor of fruit ripened in ordinary seasons.

These unfavorable weather conditions have emphasized the value of early varieties, particularly for sections such as this, where the late varieties cannot be depended upon to ripen the fruit.

We have been conducting a variety test with tomatoes for six years past, in which fifty varieties have been carefully tested. Earliana, a new variety, the seed of which was obtained from three different seedsmen, as their special variety, heads the list not only for earliness but for total crop. This is a smooth, red tomato of medium size and more than average firmness. In earliness and productiveness it was closely followed by Mayflower, Dominion Day, Atlantic Prize, and Earliest of All, which rank in the order named for total yield of ripe fruit. These varieties have for several years past stood out prominently among the best for this locality, and reports from elsewhere show that they are the favorites in most localities where tomatoes are largely grown for the market.

Cold Storage.

Since the completion of the cold storage plant here, we have been carrying on in connection with the Department of Physics a series of experiments with the cold storage of fruits. These began with strawberries, raspberries, and the bush fruits, and have

been followed up throughout the season with grapes, peaches, plums, pears, and apples kept at different temperature. The apples, pears, and peaches being put up in different styles of packages. On the whole very satisfactory results have been obtained. But as some of these experiments with apples and pears which are still in storage will probably not be completed before next summer, we shall defer publishing results until they can be given in full.

Wax Models.

We have been fortunate in securing the services of Mrs. Stanley Potter, an artist of continental reputation, who has been with us for the past year and a half preparing a collection of wax models of fruits and vegetables. Already she has done for us over three hundred and fifty models of the leading varieties of fruits and vegetables.

These models are done with such wonderful skill that it is often difficult to distinguish the model from the natural specimen from which it is made. Many a time our visitors have been deceived in thinking that the whole collection was made up of natural fruits preserved in some way from decay.

Such a collection for class work and exhibition purposes is from an educational standpoint of inestimable value, and we hope to retain Mrs. Potter for this work until we have a fairly complete collection of the most valuable varieties of Ontario grown fruits and vegetables.

Acknowledgements and Needs.

In concluding, I wish to acknowledge the faithful services of those who have labored throughout the year to keep up the work of the department. William Squirrel, who has been here since the College opened twenty-nine years ago, has charge of the gardens and grounds, and their neat and tidy appearance at all times has been largely due to his constant watchfulness and diligence. William Hunt, our new florist, has proved himself to be the right man in the right place. His skill in the management of plants, and the ability and ease with which he imparts his information to students and visitors, makes him a valuable acquisition to this department.

Mr. H. S. Peart, who obtained his degree of B.S.A. last June, and was immediately appointed as fellow in this department, has been doing excellent work. I have all confidence in his ability that he will prove to be just the man we have been looking for.

One of the most urgent needs of this, as well as of other departments employing labor, is convenient living accommodation for such help. We are in great need of at least three small houses for teamsters and night fireman. Without such accommodation it is almost impossible to get or keep the right kind of help. We trust that suitable and convenient houses for this purpose will soon be provided.

Respectfully submitted.

H. L. HUTT,

Professor of Horticulture.

PART XII.

THE PROFESSOR OF BACTERIOLOGY.

To the President of the Ontario Agricultural College :

Sir,—I have the honor to submit herewith my report on the last year's work in the Bacteriological Department.

Lectures

The following courses of lectures to our regular students were given during the year : (1) A course of thirty lectures on Bacteriology in its relation to agriculture and dairying for second-year students ; (2) a more advanced course on the relation of bacteria to agriculture and the infective diseases of animals for fourth-year students ; (3) a special course of lectures on the bacterial diseases of plants and the bacterial decomposition of fruits, vegetables, and other plant substances to the fourth-year specialists in biology and horticulture ; (4) a rather extensive course of lectures and laboratory work on dairy bacteriology to the fourth-year specialists in dairying.

In addition to the above, the following lectures, with laboratory work, were given to our short course and special students in attendance during the year : (1) To the special dairy class, which is here for three months, a course of ten lectures and a two-weeks' laboratory course. On account of the large size of this class and the small laboratory accommodation at my disposal, I had to repeat the laboratory work four times in order to give all members of the class the same instruction. This entailed a great waste of time, and I hope that additional accommodation will be provided for this work in the near future ; (2) a short course of lectures and laboratory work to the students in the special creamery course; (3) a course of lectures and laboratory work for the dairy instructors who have the control of the inspection of creameries and cheese factories during the summer under the supervision of the Superintendent of Farmers' Institutes ; (4) a few lectures and considerable laboratory work for the Macdonald teachers in Nature Study, who studied here during a part of the late summer ; (5) special lectures and laboratory work to students who have specialized along certain lines, as, for example, Mr. C. F. Whitley, of the Dominion dairy service, spent a week or two in my laboratory studying moulds and certain bacterological problems in connection with dairying ; (6) special laboratory work, involving a good deal of superintendence, was given to fourth-year specialists in agriculture, who have elected to take their thesis work in my department ; (7) four lectures, with demonstrations, to the students in the short course on Poultry Raising.

Meetings Attended.

During the year I attended a number of conventions, and delivered addresses before several meetings and associations, as follows :

1. The Dairymen's Association of Western Ontario. Address : "Injurious Flavors in Cheese."

2. The Technical School of the Dominion Master Bakers' Association. Two lectures on the "Fermentation of Bread," etc.

3. The Second Annual Meeting of the Dominion Master Bakers' Association. Address : "The Abnormal Fermentations of Bread."

4. Master Bakers' Association of the United States of America, Philadelphia meeting. Address : "The Impurities of Wheat and Flour and the Diseases of Bread."

5. The Canadian Institute. Address : on the "Bacterial Contamination of Milk and its Control."

6. Ontario Fruit Growers' Association. Address: "Pear, or Fire, Blight."

7. The American Public Health Association. Paper : on the "Supposed Identity of Human and Avian Diphtheria."

8. Short-course students in live stock judging. Address: "The Practical Results of Bacteriology."

9. Convention of Dairy Experts at Ottawa. Address: "Bacteriological Notes for 1903."

Publications.

During the year the Ontario Department of Agriculture have issued, or are issuing, the following bulletins :

Bulletin 125. By my former assistant, H. Streit, D.V.M., and myself upon "Roup, an Infectious Disease of Fowls" ; and a more scientific study of the same disease was issued as Bulletin 132, "Roup, an Experimental Study."

The bacteriological results in the ripening of cheese in cold-storage, compared with ripening in an ordinary curing room, work which has extended over the last three or four years has been written up and similar work done by Dr. W. T. Connell, Professor of Pathology in Queen's University, Kingston, have been combined, and issued in bulletin form by the Ontario Department of Agriculture, under the title, "The Bacterial Content of Cheese Ripened at Different Temperatures," by F. C. Harrison and W. T. Connell. This paper has also been published by the "Revue Generale du Lait" of Brussels, Belgium.

The Bureau of Animal Industry of the United States Department of Agriculture also published, in their nineteenth annual report, a paper of mine on the "Duration of the Life of the Tubercule Bacillus in Cheese." This article is submitted for publication in this report of the College.

Less important articles and notes were contributed during the year to various Canadian agricultural periodicals.

Routine Laboratory Work and Analysis.

During the year (January 1st to December 31st) we have manufactured and sent out 252 doses of tuberculin, 4 doses of mallein, and 187 pure cultures or starters, for cheese and butter-makers.

We have also made bacteriological analyses, or diagnoses, of the following substances, and have reported the results to those sending in the material :

Cheese	6	Water	5
Sputum	3	Peritoneal exudation	1
Pigs—Post mortem, 2; diseased, 4;	6	Black Swan	1
Pork	2	Butter paper	1
Suspected anthrax	6	Fleece from sheep	1
Pus (human)	4	Suspected tetanus	1
Diseased tissue (horses)	5	Diseased bee larvae	2
Tuberculosis, cattle	2	Meal, suspected food poisoning	1
Cream and milk	31	Suspected quarter evil	1
Tumors, bovine	3	Whey	1
Dogs	1	Blood	1
Cows—Post mortem	3	Urine	2
Mastitis	1	Butter	1
Suspected diphtheria	8		
Fowls	18	Total	135
Chickens	17		

As we frequently get inquiries about the manner in which specimens should be sent, the note regarding the assistance offered to veterinarians and farmers, printed on page 88 of last year's report, is again inserted :

Assistance Offered to Veterinarians and Farmers.

In cases of diseases, send the organs or material carefully wrapped in an antiseptic wrapper, giving full particulars regarding it. It is best to send by express ; and in summer it may be necessary to pack in ice.

In cases supposed to be, or suspected of being :

Anthrax. Send an ear, or some of the blood, spleen, or liver of the dead animal.

Symptomatic Anthrax, Black-leg, or Quarter Evil. Send the parts infected, as this disease is usually in the muscles.

Malignant Oedema (similar to black-leg, but showing more fluid in the subcutaneous tissues, which, unlike the fluid found in cases of black-leg, is almost colorless). Send the parts affected.

Tetanus or Lockjaw. On account of the difficulty of finding the bacillus of this disease, it is almost useless to send material, unless the point of inoculation is known, in which case cut away and send the flesh around the point of inoculation.

Glanders (a disease which affects either the nasal passages or the skin, in the latter case called Farcy). Send some of the ulcers from the parts infected, or of the discharge from the nasal passages.

Hog Cholera and Swine Plague. Send any diseased portions of the animal.

Actinomycosis, or Lumpy Jaw. Send in a bottle a little of the matter found in the tumor mass.

Rabies, or Hydrophobia. Send the base of the brain of medulla oblongata of the animal suspected.

Tuberculosis and Pseudo-Tuberculosis. Send any tubercules or diseased glands.

Mammitis, or Inflammation of the Udder. Send a sample of the milk in a clean bottle that has been boiled in water.

In cases of diseases affecting poultry, such as Chicken Cholera, Roup, Tuberculosis, or Blackhead, send the whole bird.

Assistance.

I regret to report that H. Streit, D.V.M., resigned his position as assistant in this department in order to take up a veterinary practice in partnership with his father at his home in Zimmerwald. Dr. Streit has proved a willing, faithful, and very competent assistant, and I much regret having lost his services. Considerable difficulty was experienced in obtaining a suitable person to fill his place ; and it was not until the beginning of November that I succeeded in obtaining an assistant, when Mr. Bronson Barlow, Assistant Bacteriologist in the Michigan Experiment Station, was appointed. Mr. Barlow was very highly recommended by Dr. Charles E. Marshall, Professor of Bacteriology and Hygiene, at the Michigan Agricultural College, and I feel sure that his work will be appreciated by our own students and the farmers of the Province.

Urgent Needs.

In my last year's report, I called your attention to the need of more room for practical work in bacteriology. The ever-increasing number of students ; the diversity of the work in which we are engaged (Bacteriology in its relations with Horticulture, Live Stock, and Dairying, Fermentation Problems in bread-making, cider-making, vinegar-making, etc.) ; and the establishment of the Macdonald School for Domestic Science—have all contributed towards making the need of increased accommodation more urgent than ever. With our present accommodation, it is impossible to handle more than one class at a time, so we have the inconvenience of dividing and sub-dividing classes, and the loss of time caused by repeating laboratory work for the dairy students is very great. I feel that it is impossible to do justice to the various classes of students with

our present laboratory facilities, and I would respectfully call your attention to the fact that two of the leading agricultural institutions in the United States—the Agricultural Department of Wisconsin University and Experiment Station and the Michigan Agricultural College—have recently erected and equipped complete bacteriological laboratories for instruction and research. The Wisconsin laboratory cost about $50,000; and that of the Michigan Agricultural College cost $35,000 for the building, and $20,000 for the equipment placed in it. Several Agricultural Colleges in the United States have in prospect buildings similar to these, to cost from $30,000 to $75,000. In view of these facts, I think it is time that the Ontario Agricultural College had a separate building for bacteriological work, as the need of laboratories for instruction is very great, and the field for research work is so wide and the demands so numerous that something ought to be done at once. In proof of these statements, I may mention a few of the problems upon which we have been engaged to show the diversity of the work which has already been done in this department: Bacterial diseases of bees; infectious diseases of poultry; studies in bovine tuberculosis; problems relating to dairying—the abnormal fermentations of butter, milk, and cheese; the manufacture of tuberculin and mallein; the preparation of pure cultures for cheese and butter-makers; the normal and abnormal fermentations of dough and bread; the bacterial diseases of plants; studies in cider-making; and the analysis of water. See also on page 97 a list of 135 examinations made during the year for farmers, veterinarians, and others who have sent materials of various kinds to the laboratory.

Research Work.

On account of my being without an assistant from March till November, the research work undertaken during the year has been confined chiefly to the solution of problems already on hand. Not much new work has been undertaken. The routine laboratory work has engrossed most of my attention. Mention has already been made of the work upon the bacterial content of normal Canadian cheddar cheese; and, in addition to this, one of the commonest abnormal fermentations of cheese—the gaseous fermentation—has been studied. Some work has also been done upon the slimy, or "ropy," fermentations of milk. This affection seems to be rather common in some parts of the Province; and we have isolated several organisms which produce the slimy condition in ordinary milk supplied for household use.

Some studies have also been made of the bacterial decomposition of roots,—an affection which seems to be of considerable importance, as many farmers in different parts of the Province have reported a considerable amount of rot in stored turnips. Pear, twig, or fire blight, as it is variously termed, was also very common during the growing season in the Niagara and Grimsby districts; and, in consequence of this, an address on the subject was given at the annual meeting of the Ontario Fruit Growers' Association. This address will be published in the report of that Association for 1903.

It is pleasing to be able to record the growing interest taken by the bakers of the Province in fermentation subjects, as evidenced by the formation of a technical school for baking; and I quote a few paragraphs from an editorial in the "Canadian Baker and Confectioner" regarding the establishment and success of this school:

The Bakers' School.

"The two days' school of Technology in Baking and Bakery Methods held in Toronto on April 29th and 30th, forms a unique event in the history of the Canadian baking trades. It is one that promises to develop results that will have an important bearing on the future of the bread industry in Canada. This two days' course of technical study as applied in the making of bread is the first of the kind recorded on this continent. Bakers' associations in a number of the States in the Union have agitated for something of this nature, but it remained for the Provincial Government of Ontario, through the agitation of some of the active members of the Cana-

dian Master Bakers' Association, together with the Baker and Confectioner, to bring about the consummation reached last month.

"At the convention of last year, which was naturally largely experimental in its nature, the bakers in attendance evinced so keen an interest in technical education that those most actively concerned were encouraged to seek the aid of the Provincial Government in establishing regular institutions. Accordingly, in February last the Executive Committee of the Canadian Master Bakers' Association, with a number of other bakers and millers, interviewed the Hon. John Dryden, Minister of Agriculture, and Mr. C. C. James, the Deputy Minister, and put the desires of the baking trade before them.

"As a result, the Ontario Government agreed that Professors F. C. Harrison and R. Harcourt, of the Ontario Agricultural College, should give their services as a nucleus, the Association to provide accommodation, time, and students.

"The school, it might be stated, was in a measure a feeler thrown out to see to what extent the advantage of technical education might be appreciated by the bakers of this country. It is safe to say that there is no doubt as to the feeling in this direction, and efforts will be made to establish a permanent baking plant at the Ontario Agricultural College, where practical tests and experiments may be conducted, and courses in baking held in the near future.

"Professors Harcourt and Harrison are now in a position to know what the bakers require along the line of technical instruction. Previously they have been, figuratively speaking, groping in the dark. The study of flour has not been carried on to any great extent, and there are, therefore, no precedents for guidance in this study. Hitherto the difficulties of bakers have not been realized or appreciated except by themselves; but with the continued application of those so actively engaged in what has already been done, bakers will be in a position to obtain practical, as well as theoretical, help that will be of incalculable value to them."

The above extract shows that the Ontario bakers appreciate not only practical instruction, but also such experimental work as has been done for them by our Chemical and Bacteriological Departments. I trust that this work will be enlarged, and that facilities may be provided, not only for practical tests in baking, but also for laboratory work upon flours from Ontario, Manitoba, and elsewhere. One of our fourth-year students is at present working upon the acid bacteria which are found in flours; and I regret to say that this work has been considerably hindered during the session for lack of room. It seems hardly necessary to add that this is an additional reason for the erection and equipment of a new bacteriological laboratory.

The Duration of Life of the Tubercle Bacillus in Cheese.

Pathogenic germs, as a rule, have but slight vitality in cheese, but of those which may be present, the tubercle bacillus seems to be the most resistant. The large percentage of tuberculous dairy cattle in Europe, and even in newer countries, makes it important to inquire as to the length of life of the tubercle bacillus in cheese: how often and in what numbers it may be present; what danger there is to the individual who may eat cheese containing the germ; and whether the by-products from the manufacture of such cheese are dangerous to animals fed upon them.

Previous Investigations in the Same Field.

If we accept the conclusions of Rabinowitch and Klemperer, (1*) we must be prepared to acknowledge that, not only the milk of cows having either tubercle in the udder of advanced generalized tuberculosis is dangerous, but also the milk of cows which exhibit no clinical symptoms of the disease, but give the tuberculin reaction. If these results are accepted, a considerable increase must be recognized in the per-

* For bibliographic references, see page 112.

centage of tuberculous cattle whose milk will be regarded ar dangerous or treated as suspicious.

Galtier, (2) in 1887, examined cheese and whey, to ascertain what risk of contracting tuberculosis man and animals ran from eating these products. The experiments were made with normal milk tuberculosed by the addition of morbid material taken from diseased phthisical cows killed in the abattoirs, or from rabbits which have died from tuberculosis induced by injection. The milk was coagulated by the addition of rennet; and with the cheese and whey thus obtained attempts were made to ascertain the facts as to the transmission of tuberculosis. Unfortunately, Galtier does not state whether the curd was pressed and made into hard cheese or was left without pressure as soft cheese. The inoculations were made into guinea pigs (intraperitoneally) and into rabbits (intravenously). The particles of cheese were triturated in sterilized water, and the liquid part of the mixture, separated by decantation of filtration, was used for the inoculations. The whey was also filtered before each inoculation, and in this manner the animals were inoculated with cheese and whey of the age of 5, 10, 15, 20, and 30 days, etc. Some of the attempts did not furnish positive results; but the number of cases of undeniable transmission was large enough to establish the preservation of tubercle germs and of the noxious character of the products of the milk which contained them. Galtier obtained "generalized tuberculosis" from cheese not salted and salted, 5, 10, and 15 days old, and from some which was even 2 months and 10 days old. In several experiments, the disease was found in only one-half or one-third of the subjects inoculated; and in other experiments, which were not the most numerous, the results were negative in animals inoculated with cheese 2 months old and even only 15 days old.

The whey, separated from cheese 5, 10, and 15 days before, agitated and filtered before inoculation, invariably gave tuberculosis to guinea pigs, which, however, resisted the inoculation of this product made in doses of 2 c. c.

Like results were obtained from rabbits. Whey 2 days old produced innumerable tubercle lesions in the rabbits inoculated; and the same product, kept for 9 and 16 days, equally produced the disease, but in a slower and milder form.

Finally, cheese 5, 9, 16, and 20 days old, produced authentic tuberculosis in rabbits, from which the germ was subsequently cultivated on artificial media and transmitted to other animals.

From these experiments Galtier concludes that coagulated milk, fresh cheese and salted cheese, made from the milk of tuberculous cows, may infect man; that the by-products from such milk fed to swine and farmyard fowls may infect these animals; and that it is not irrational to conclude that a certain number of the cases of chicken and swine tuberculosis are due to this cause.

Heim (3) in 1889 also gave attention to this subject. He used cultures of tubercle bacilli grown upon sheep's blood serum. In curd which was mixed with tubercule bacilli he found living germs on the second day (using guinea pigs, injected intraperitoneally) with water-suspended particles of the curd, but none after 14 days.

In curd prepared from milk to which tubercle bacilli had been added, germs were found, even after 14 days, but none after 4 weeks; and also in the whey obtained at the same time, the bacilli were found alive after 14 days.

As may be noted, these results of Galtier's and Heim's differ considerably, the difference being accounted for in part by the different methods of experiment; and for this reason, as well as others, it seemed advisable to make some further investigation as to the duration of the life of the tubercle bacillus in cheese.

Description of Methods Employed in Switzerland.

While studying at Berne, I planned and conducted a series of experiments, as follows:

Cultures used. The growth from five potato-tube cultures, 4 weeks old, was scraped off and triturated in a sterile mortar with 6 per cent. glycerine. To this mass

was added the surface growth of tubercle bacilli from 125 c. c. of glycerine bouillon. The whole quantity was ground up as finely as possible and sterilized water (about 200 c. c.) added.

Manufacture of the Cheese. Two cheeses were made in separate vessels and by somewhat different methods, 10 liters, or about 22 pounds, of milk having been used for each. It was intended that these cheeses should, respectively, resemble as nearly as possible the Swiss Emmenthal and the American Cheddar varieties. Both lots of milk were heated to 35 degrees C. (95. F.), a portion of the tuberculous emulsion was added to each, and the mixture was thoroughly stirred. One-fifth of one of Hansen's rennet tablets, dissolved in water, was used for each cheese. Five minutes after the addition of the rennet, more of the tubercle emulsion was added, and again after fifteen minutes. The same amount was used in each cheese.

The milk had completely set in thirty-three minutes, and the curd was then cut and stirred with a wire stirrer and left for ten minutes. At the expiration of this time, cheese "A" was heated to 55 degrees to 56 degrees C., and kept constantly stirred for thirty minutes at this temperature, according to the usual practice in making Emmenthaler cheese. At the end of this time the curd was transferred to a suitable mould, and a 5-kilogram weight (11 pounds) placed upon it. Cheese "B" was stirred for two hours at a temperature of 36 degrees to 38 degrees C. (97 degrees to 100 degrees F.); this was in accordance with the Cheddar cheese method, in which the temperature does not rise above 37 degrees C. (or above 98 degrees F.). On account of lack of the necessary apparatus, other processes usual in making Cheddar cheese were not followed. The curd of this cheese (B) was also transferred to a mould and a 5-kilogram weight placed upon it. After four hours the weight was increased to 8 kilograms (17 1-2 pounds) on each cheese. The following day the cheese was turned, an operation which was twice repeated. On the second day they were removed from the moulds, and salt was rubbed all over them, a thin layer being left on the top. The cheese were kept at a temperature of about 5 degrees C. (41 degrees F.) for a week, being rubbed with salt and turned every day; and at the end of about 10 days they were removed to an empty chest in which the temperature was between 12 degrees and 18 degrees C. (53 degrees to 65 degrees F.) The cheese were kept free from mold by washing them every second or third day with strong brine for four weeks, after which they were washed only once a week.

Amount of cheese used for injection. A plug of cheese was removed with a sterile cork borer, and a varying quantity, drawn from the centre of the cheese, was transferred to a sterile mortar. This portion was thoroughly triturated with sterile distilled water of bouillon, and the remainder of the plug was replaced in the cheese.

Injections. Guinea pigs were used as the test animals, and the injections were made subcutaneously near the inguinal region. The first inoculation was very difficult, as the needle of the syringe, although large, became blocked by particles of curd. For subsequent injections the following technique was used, which gave good satisfaction: The animal was fastened to a dissecting board, and the hair was closely clipped over the inner portion of the thigh. This part was then washed with corrosive sublimate, after which a small hole was made in the skin with a large needle, and the end of a glass pipette (freshly made for each inoculation and consequently sterile) filled with the emulsion was introduced and the contents blown in. A pair of pressure forceps immediately applied to the small hole and held for a few minutes, closed the orifice and prevented the escape of the emulsion.

The average weight of the guinea pigs used in the experiment was 500 grams, or about 18 ounces.

Observations of the animals during life. The animals were weighed and examined every week; and the presence of tuberculosis was often indicated by the swelling of the inguinal glands and by a gradual loss of weight. At the end of six weeks or longer, .1 c. c. of tuberculin was injected, and in animals badly affected death usually

followed in twenty-four hours ; but in animals slightly diseased there was a marked rise of temperature, often more than 2 degrees C. In fact, the smaller the amount of tubercle present, the more intense was the reaction. The same dose of tuberculin was often injected into healthy animals ; but in no case did the temperature rise 0.4 degrees C. above the normal.

Post Mortem. The post mortem examinations were made shortly after death, and animals not killed by the tuberculin injection were chloroformed and promptly examined. The presence of all lesions was noted. At least three preparations were made from diseased glands and organs, and these were stained by the Ziel Neelsen method.

If we examine Tables I. and II. we notice, almost at the first inspection, the difference in the vitality of the germs of tuberculosis taken from the different cheese. For instance, in the case of guinea pigs inoculated with Emmnethaler cheese 14 days old, the tuberculin reaction was high, the animals did not succumb to the injection, and the post mortem revealed less disease than was present in animals injected with Cheddar cheese 40 days old ; and, compared directly with the animals injected with the latter cheese of the same age, namely, 14 days, the difference was still more marked, one guinea pig dying naturally of the disease, and the other dying from the inoculation with tuberculin. Like results may be noticed from all the succeeding inoculations.

Observations upon the Results.

The tubercle bacilli in Emmenthaler cheese were all dead when the cheese was between 33 and 40 days old, for we find that the animals injected with 33-days-old cheese, although they gave a tuberculin reaction of 2 degrees C. and over, showed no signs of the disease at the post mortem, and both had gained considerably in weight. Cases similar to this have been noticed in tuberculin-tested cattle. Probably, if the inguinal glands from these animals had been transferred to other guinea pigs, the disease might have established itself in the reinjected animals. The animals subsequently injected (40 days, 47 days, etc.) were all free from tubercle and gave no marked tuberculin reaction. Two animals, however, died from other causes.

The tubercle bacilli in the infected Cheddar cheese were more long-lived, as they continued capable of causing disease up to 104 days old, at which time one guinea pig had a very slight infection, and the other was quite free from tubercle. By a mistake the guinea pigs infected from cheese 111 and 113 days old, respectively, were killed for other work about a month after injection. They were all perfectly healthy ; but as they had not been tested for tuberculin, and as sufficient time had not been given for tubercle bacilli to establish themselves, they are not included in Table II. One may, however, safely conclude that the vitality of tubercle bacilli in this cheese did not much, if any, exceed 104 days.

The great difference in the duration of life of the germs in the two cheese—about 70 days—can be ascribed only to the difference in the method of manufacture. The heat used in making the Emmanthaler cheese (from 50 degrees to 54 degrees C.) and the length of time the curds are kept at this temperature evidently causes the death of the weaker tubercle bacilli and the enfeeblement of the more resistant. The whey from this cheese was also less virulent. Guinea pigs inoculated with it did not die after the tuberculin inoculation, and the post mortem showed less disease than in those animals inoculated with the same quantity of whey from the Cheddar cheese.

The guinea pigs inoculated with cheese (both kinds) 7 days old, all died two days after inoculation ; and from these animals the bacillus of malignant edema, as well as Bacillus coli and B. staphylo-albus, were isolated. I cannot believe that the presence of these germs was due to an accidental infection, as exceptional precautions were taken to avoid such complications. At the same time, it is remarkable that subsequent inoculations did not show the presence of the bacillus of malignant edema, which, on account of the resistant nature of its spores, one would expect to survive in

Results of inoculating guinea pigs with cheese and whey of various ages, to test infection of tubercle bacilli.

EXHIBIT I.—EMMENTHALER CHEESE.

No. of guinea pig.	Age of inoculated cheese.	Quantity of cheese inoculated	Tuberculin reaction.	Died or killed, and days after inoculation.	Post mortem.	Microscopic examination.	Remarks.
		Grams.	° *C.*				
1	Fresh curd	½	1.7	Died, 52 days..	Tubercle in inguinal and retroperitoneal glands, mesentery, spleen, and liver.	Tubercle bacilli in the glands and spleen.	Died 24 hours after injection of 0.1 c. c. tuberculin.
2	7 days.....	½	.....	Died, 2 days ..	Muscles dark and infiltrated, edematous fluid.	Bacilli and staphylococci in the fluid.	Cultures and inoculation of rabbits showed *B. coli*, *B. edematis maligni*, and *Staphylococcus albus*.
3	do	½	.....	do ..	do	do	do.
4	14 days..... ..	½	2 0	Killed, 56 days.	Tubercle in inguinal and retroperitoneal glands, liver, and spleen.	Tubercle bacilli in glands and spleen.	Inoculated with 0. 1 c. c. tuberculin.
5	do	½	2.2	do ..	do	do	do.
6	21 days.....	½	2.0	Killed, 49 days.	Tubercle in inguinal and retroperitoneal glands ; spleen, slightly affected.	Tubercle bacilli in the glands.	do.
7	do	½	1.9	do ..	Tubercle in inguinal, retroperitoneal, and mesenteric glands ; spleen slightly affected.	do	do.
8	28 days.....	¾	1.9	Killed, 59 days.	Tubercle in inguinal and retroperitoneal glands.	do	do.
9	do	¾	1.4	do ..	do	.....	
10	33 days.....	¾	2.0	Killed, 64 days.	All organs normal ; animal in good health ; has gained 160 grams since inoculation.	No tubercle bacilli found in either the glands or organs.	Inoculated with 0. 1 c. c. tuberculin. A control animal injected with the same quantity of tuberculin gave a reaction of 0.2° C.
11	do	¾	2.3	do ..	All organs healthy ; has gained 230 grams since inoculation.	do	do.
12	40 days.	1	0.3	Killed, 70 days	All organs and glands normal	No tubercle bacilli	Inoculated with 0.1 c. c. tuberculin.
13	do	¾	0.4	do ..	do	do	do.
14	47 days...	1	0.2	Killed, 64 days.	do	do	
15	do	1	0.4	do ..	do	do	do.
16	54 days.....	1	0.5	Killed, 66 days.	do	do	do.
17	do	1	0.3	do ..	do	do	do.
18	63 days..... ..	1	0.3	Killed, 58 days.	do	do	do.
19	do	1	....	Died, 7 days ..	do	do	
20	70 days.....	1	.....	Died, 46 days..	Intestine strangulated through a hole in the mesentery.	do	
21	do	1	0 4	Killed, 65 days.	All organs and glands normal	do	do.

EXHIBIT II.—CHEDDAR CHEESE.

1	Fresh curd.	½	1.2	Died, 45 days.	Inguinal, mesenteric, and retroperitoneal glands tuberculous. Tubercle in the spleen.	Tubercle bacilli in all glands	Died, 36 hours after injection of 0.05 c. c. tuberculin.
2	7 days	1		Died, 2 days.	Muscles dark and infiltrated; edematous fluid.	Large bacillus and staphylococci in the fluid.	Cultures and inoculation of rabbits showed *B. coli*, *B. edemantis maligni*, and *Staphylococcus albus*.
3	do	1		do	do	do	do.
4	14 days	½		Died, 35 days.	Inguinal, retroperitoneal and mesenteric glands infected; also spleen and liver.	Tubercle bacilli in glands and spleen.	
5	do	½	1.6	Died, 49 days.	do	do	Died 24 hours after injection of 0.1 c. c. tuberculin.
6	21 days	½	1.1	Killed, 49 days.	Tubercle in inguinal and retroperitoneal glands, spleen and liver.	do	
7	do	½	1.0	Died, 50 days.	do	do	do.
8	28 days	¾		Died, 56 days.	Tubercle in inguinal and retroperitoneal axillary glands, spleen, liver, and lungs.	Tubercle bacilli in glands and liver.	Died 1 hour after injection of 0.1 c. c. tuberculin; was very weak and sick before injection.
9	do	¾	0.9	Killed, 57 days.	Tubercle in glands, spleen, liver, and lungs. Tubercles on the peritoneum.	Tubercle bacilli in glands and spleen.	
10	33 days	¾	1.2	Died, 64 days.	Tubercle in glands, spleen, and liver.	Tubercle bacilli in glands	Died 24 hours after injection of 0.1 c. c. tuberculin.
11	do	¾		Died, 10 days.	Peritonitis	No tubercle bacilli in glands	
12	40 days	¾		Died, 7 days.	Very much wasted; large swelling at seat of inoculation.	Cultures from the spleen and microscopic examination showed staphylococcus albus.	do.
13	40 days	¾	0.9	Died, 70 days.	Tubercle in inguinal and retroperitoneal glands, and in spleen, liver and lungs.	Tubercle bacilli in glands and liver.	
14	47 days	1	0.9	Died, 64 days.	Tubercle in inguinal and retroperitoneal glands, spleen, and liver.	do	Died 24 hours after injection of 0.1 c. c. tuberculin.
15	do	1	0.5	do	do	do	do
16	54 days	1		Died, 5 days.	Peritonitis		
17	do	1		Died, 64 days.	Tubercle in inguinal and retroperitoneal glands, spleen, and liver.	Tubercle bacilli in glands and spleen.	
18	63 days	1	1.1	Died, 57 days.	do	Tubercle bacilli in glands and liver.	do
19	do	1	0.8	do	do	do	
20	70 days	1	0.8	Died, 65 days.	do	Tubercle bacilli in glands	do
21	do	1	0.5	do	do	do	do
22	77 days	1	0.9	do	Tubercle in inguinal and retroperitoneal glands and spleen.	do	do

Results of inoculating guinea pigs with cheese and whey of various ages, to test infection of tubercle bacilli.—*Continued.*

EXHIBIT II.—CHEDDAR CHEESE.—*Continued.*

No. of guinea pig.	Age of inoculated cheese.	Quantity of cheese inoculated	Tuberculin reaction.	Died or killed, and days after inoculation.	Post mortem.	Microscopic examination.	Remarks.
		Grams.	° *C.*				
23	77 days.....	1	1.0	Died, 65 days..	Tubercle in inguinal and retro-peritoneal glands and spleen.	Tubercle bacilli in glands.	Died 24 hours after injection of 0.1 c. c. tuberculin.
24	84 days.....	1	1.3	Killed, 40 days.	Tubercle in inguinal and retro-peritoneal glands.	do	0.1 c. c. tuberculin inoculated.
25	do	1	1.5	do ..	do	do	do
26	104 days.....	1	2.0	Killed, 70 days.	Tuberculosis in inguinal glands...	do	do
27	do	1	0 3	do ..	All organs and glands normal; much increase in weight	No tubercle bacilli.....	do
28	125 days.....	1	0.4	do ..	All organs and glands healthy....	do	do
29	do	1	0.2	do ..	do	do	do
30	132 days.....	1½	0.2	do ..	do	do	do
31	do	1½	0.5	Killed, 71 days.	do	do	do

EXHIBIT III.—WHEY.

	Age and kind of whey.	*c. c.*					
1	Whey from cheese A, 4 hours old.	1.5	1.5	Killed, 70 days	Tubercle in inguinal and retro-peritoneal glands, spleen, and liver.	Tubercle bacilli in glands and spleen.	0.05 c. c. tuberculin inoculated.
2	Whey from cheese A, 48 hours old.	1.5	1.4	Killed, 49 days.	Tubercle in inguinal and retro-peritoneal glands and spleen.	Tubercle bacilli in glands.....	0.1 c. c. tuberculin inoculated.
3	do	1.5	1.7	do ..	do	do	
4	Whey from cheese B, 4 hours old.	1.5	1.6	Died, 43 days..	Tubercle in inguinal and retro-peritoneal glands, spleen, and liver; badly infected.	Tubercle bacilli in glands and liver.	0 05 c. c. tuberculin injected; died 24 hours later.
5	Whey from cheese B, 48 hours old.	1.5	1.1	Died, 49 days..	Tubercle in inguinal and retro-peritoneal glands, spleen, and liver.	do	0.1 c. c. tuberculin inoculated; died 36 hours later.
6	do	1.5	1.4	do ..	do	do	

Exhibit IV.—Cream Cheese

	Kind of cheese.	*Grams*					
1	Cream cheese..	2	1.2	Died, 57 days..	Tubercle in inguinal and retro-peritoneal glands, spleen and liver.	Tubercle bacilli in glands and spleen.	0 1 c. c. tuberculin injected; died 36 hours later.
2	do ..	2	....	Died, 4 days...	do	do	do
3	do ..	2	0.3	Killed, 58 days.	All organs and glands normal.	No tubercle bacilli.....	0.1 c. c. tuberculin injected.
4	do ..	2	0.4	do ..	do	do	
5	do ..	2	0.2	do ..	do	do	do
6	do ..	2	0 2	do ..	do	do	do
7	do ..	2	1.3	do ..	Tubercle in inguinal and retro-peritoneal glands and spleen.	Tubercle bacilli in glands..	do
8	do ..	2	1 2	Killed, 49 days	do	.....	
9	do ..	2	2.1	Killed, 50 days.	Tubercle in inguinal and retro peritone l glands.	Tubercle bacilli in glands.....	do
10	do ..	2	2.5	do ..	do	do	

Exhibit V.—Cheddar Cheese made in Canada.

1	Fresh curd ...	1	1.9	Died, 70 days.	Tuberculosis of inguinal, retroperi-toneal glands, spleen and liver.	Tubercle bacilli in glands	Died 18 hours after injection of 0 1 c.c. tuberculin.
2	do ...	1	1.4	do ..	do	do	do
3	7 days	1.5	....	Died, 6 days..	Peritonitis	Coli infection.....	
4	do	1.5	1.5	Died, 78 days..	Tuberculosis of glands, spleen and liver; the latter badly inf cted.	Tubercle bacilli in glands	Died 24 hours after injection of tuberculin.
5	14 days.....	1.5	1.5	Died, 90 days..	Tuberculosis of inguinal retroperi toneal, and mesenteric glands; spleen and liver badly infected.	Tubercle bacilli in liver and retro-peritoneal glands.	
6	do	1.5	2.2	Died, 84 days.	do	do	Died 18 hours after injection of 0.1 c.c. tubercu in.
7	21 days..... ..	1.5	.....	Died, 42 days..	Tuberculosis of inguinal, retroperi-toneal, and mesenteric glands, spleen and liver.	Tubercle bacilli in liver.....	
8	do	1.5	1.4	Died, 63 days..	do	Tubercle bacilli in liver and retro-peritoneal glands.	Died 28 hours after injection of 0.1 c.c. tuberculin,
9	28 days... . ..	1.5	.....	Died, 2 days...	Peritonitis; edema	Coli bacteria and a bacillus resem-bling *B. edematis maligni.*	
10	do	1.5	1.7	Died, 63 days..	Tuberculosis of glands, liver and spleen.	Tubercle bacilli in liver	do
11	37 days.....	2	1.9	Killed, 65 days.	Tuberculosis of inguinal and retro-peritoneal glands and spleen.	Tubercle bacilli in glands	0.1 c.c. tuberculin injected.
12	do	2	1.6	do ..	do	do	do
13	42 days.....	2	1.6	Killed, 56 days.	do	Tubercle bacilli in retroperitoneal glands.	do

Results of inoculating guinea pigs with cheese and whey of various ages, to test infection of tubercle bacilli.—*Concluded.*

EXHIBIT V.—CHEDDAR CHEESE MADE IN CANADA.—*Concluded.*

No. of guinea pig.	Age of inoculated cheese	Quantity of cheese inoculated	Tuberculin reaction.	Died or killed, and days after inoculation.	Post mortem.	Microscopic examination.	Remarks.
		Grams	° *C.*				
14	42 days	2	.....	Died, 12 days.	Streptococcus infection	Streptococci in organs and blood.	
15	52 days	2	1.8	Killed, 63 days.	Tuberculosis of inguinal and retroperitoneal glands; spleen slightly infected.	Tubercle bacilli in retroperitoneal glands.	0.1 c.c. tuberculin injected.
16	do	2	1.7	do	do	do	do
17	62 days	2	1.7	Killed, 67 days.	Tuberculosis of inguinal and retroperitoneal glands	Tubercle bacilli in glands	do
18	do	2	1.5	do	Tuberculosis of inguinal glands	No tubercle bacilli	do
19	70 days	2	.6	Killed, 70 days	All organs and glands normal and healthy.	do	do
20	do	2	.4	do	do	do	do
21	80 days	2	.4	Killed, 64 days.	do	do	do
22	do	2	.3	do	do	do	do
23	91 days	2	.4	do	do	do	do
24	do	2	.6	do	do	do	do
25	102 days	2	.4	Killed, 62 days.	do	do	do
26	do	.....	.4	do	do	do	do
27	112 days	.....	.6	Killed, 82 days.	do	do	do

the cheese for some time. Weigmann has found and cultivated from cheese bacilli similar in morphological character.

The tuberculin reactions which served incidentally for measuring the strength of the tuberculin used have been already mentioned, and the results obtained fully confirmed those given by Donitz. They also served, apart from the post mortem, to give some idea of the extent of the disease in the guinea pigs, the amount of the disease usually being in inverse ratio to the amount of the reaction. Reference and comparison of Tables I. and II. show this very strikingly.

Conclusions from the Original Experiments in Switzerland.

From these results we are safe in concluding that hard cheese—especially Emmenthaler—is quite safe for human food so far as tuberculosis is concerned. Both Cheddar and Emmenthaler are seldom eaten until they are 4 months old or more; at this stage all tubercle bacilli which they may have contained will be dead. We should also remember that the number of tubercle bacilli likely to be present in cheese, as commonly made, is very small, and that in all probability those will die sooner than bacilli put into cheese in the course of experiments like these. Besides this, the original number of such germs in milk will be reduced by being carried off in the whey.

From the experimental data it would seem advisable to use the milk of tuberculous cows, segregated according to Bang's system, for making cheese rather than butter—that is, on the assumption that the latter is made without proper pasteurization of milk or cream. The whey from such milk should be heated to 85 degrees C. (185 degrees F.), which would not only kill any tubercle bacilli that might be present, but would also have other excellent economic effects.

Experiments With Whey, and Comments.

The experiments with the whey from cheese A and B were ony to find out if the tubercule bacilli in milk were present in numbers in the whey and if they could live therein for 48 hours, as this is about the limit of time that whey is kept. As has already been remarked, the whey from the Cheddar cheese (B) was more virulent than that from the Emmenthaler (A); but the latter was also infectious. Ostertag 4 has noted that intestinal tuberculosis is sometimes caused by feeding separator slime to pigs; Galtier also remarked on the probability of swine and poultry becoming infected with tubercle by eating the by-products of milk; and, in my opinion, this phase of the question is even more important than the human side. At present, outside of Denmark, very little whey is pasteurized, or rather heated to 85. degrees C.; and when we consider the small cost of the operation (as exhaust steam may be used for the purpose) and the benefits to be derived from it, we wonder why it is not done more frequently. In America cheesemakers look upon the contamination of milk cans by unpasteurized whey as one of the principal sources of the many troubles met with in making cheese during the summer months. So we have a threefold benefit from heating whey to 85 degrees C.: (1) Destruction of tubercle and other pathogenic bacteria; (2) better keeping of the whey itself; (3) the removal of a prolific source of bacterial contamination of milk cans.

Denmark, 5 recognizing the danger in the by-products of milk, has enacted a law which makes compulsory the heating of all such products (whey, skim milk, and buttermilk) to at least 85 degrees C. (185 degrees F.).

Trials With Cream Cheese, and Results.

As will be noticed in the tables, a few trials were also made with cream cheese. The samples of this variety were bought on the open market in Berne, and the age of some of them was not known; but they all appeared to be only a few days old. Too few

samples were examined to warrant the drawing of general conclusions from the experiments. The amount of cheese injected was rather large ; and we must remember that a larger proportion of tubercle bacilli is found in cream and in milk sediment than in the milk. Even in the separator, many bacilli are thrown out with the cream. So we may expect that a larger number will be found in cream cheese than in ordinary hard cheese. Of the five samples examined three were found to contain tubercle bacilli—one cheese evidently containing large numbers, if we can judge from the amount of infection. See guinea pig No. 1, Table IV.). The others were only slightly infected.

There is evidently, then, some danger to be apprehended from cheese of this kind —just how much cannot be stated. But there is no reason why pasteurized cream should not be used for cream cheese, because the objections to using pasteurized milk for making hard cheese do not hold in making cream cheese.

Note.—The work described herein was done in the bacterological institute of the University of Berne, and I wish to record my sincere thanks to Dr. de Freudenreich for his kind assistance, interest, and criticism while the work was in progress.—F. C. H.

Supplementary Report Based Upon Cheddar Cheese.

The experiments upon the duration of life of the tubercle bacillus in cheese made at Berne in 1899-1900 (published in the Landwirtschaftlichen Jahrbuch der Schweiz, 1900, and of which the foregoing is a translation), demonstrated that the tubercle bacillus died between the thirty-third and fortieth days in cheese made after the Emmenthaler method ; but in cheese made approximately after the Cheddar method, the duration of life of the bacillus was considerably longer.

On account of objections to the imperfect method of manufacture of the Cheddar-like cheese made in Berne, it seemed advisable to repeat the experiment by making a typical Cheddar cheese in a country where such cheese is regularly made. As Russell remarks (Outlines of Dairy Bacteriology) :

"Our domestic Swiss cheese, or even cheese of this class made in Germany, rarely have the peculiar flavor that is found in the product imported from the Swiss valleys. For centuries this brand of cheese has been made in that country, until the factories and dairies have become stocked with the right kind of germs, capable of producing the desired fermentation."

If this is true of Swiss cheese manufactured in America, it is likely to be also true of Cheddar cheese made in Switzerland. If added to this objection there is the further one that the details of manufacture of Cheddar cheese made in Switzerland were not identical with the ordinary practice in the making of this cheese, we clearly see that in the interest of scientific accuracy, as well as in the comfort and security that might be obtained from the knowledge of the fact that any tubercle bacilli were likely to be dead before the cheese was ripe and ready to be eaten, it was necessary to carry out another series of experiments upon Cheddar cheese made in the approved manner. This was accordingly done by the writer in the year 1901, and these experiments are first described and reported as follows :

Culture.

The culture used was of bovine origin, the seventh transfer since isolation from a tuberculous guinea pig inoculated with a piece of liver from a tuberculous cow. The whole of the growth from 700 c. c. of glycerine bouillon 12 weeks old was used. The growth was very heavy, and on account of the difficulty of separating the masses of bacilli in the pellicle, sterilized powdered glass was used in order to break up the clumps of bacilli, and a fairly good emulsion was thus obtained, which was added to the milk at the same time as the rennet. The infected milk was then stirred constantly for five minutes, when coagulation commenced.

The Cheese.

Eighty pounds of milk in good condition were used for making the cheese. The acidity of the milk was 0.14 per cent., and 1½ pounds of a pure culture of a lactic acid bacillus was added, together with 1 dram of cheese color. The milk was set at 36 degrees F., after the rennet test was found to be twenty seconds. Two drams of rennet were used. The other particulars about making this cheese were as follows :

Time between setting and dipping	3 hours.
Time between dipping and milling	2 hours 10 minutes.
Time between milling and salting	1 hour 10 minutes.
Amount of acid at milling	1½ inches.
Amount of salt	3 ounces.
Acidity of curd before salting	8 per cent.
Weight of press on cheese	1,000 pounds.
Weight after cheese was turned	2,000 pounds.

The cheese worked quite normally, the curd having a nice silky feeling and meaty texture. All operations of stirring, etc., were performed with the hands inclosed in a pair of rubber gloves, such as are employed for surgical use, the endeavor being to produce a typical Cheddar cheese, made in exactly the same manner as in a cheese factory.

The cheese was ripened at an average temperature of 60 degrees F., which is regarded as being very suitable for Cheddar cheese, as it does not injure the texture or cause the fat to run out.

With regard to such details as the amount of cheese used for inoculation of the guinea pigs, the method of inoculation, observations of animals during life, autopsy, and microscopic preparations, they were the same as in the Berne experiments ; hence it is unnecessary to repeat them.

The acidity of the cheese was tested when a month old. Five grams of cheese and an equal amount of glass were ground together in a mortar ; 100 c. c. of water was then added and well mixed with the cheese. After standing fifteen minutes, the mixture was passed through a filter paper. Twenty-five cubic centimeters of the clear filtrate were taken for the determination of the acidity. Phenolphtalein was used as an indicator. The result of this test showed 0.95 per cent. acid---figured as lactic acid. A bacteriological analysis was also made at the end of one month ; and 1 gram of cheese contained 43,700,000 lactic acid bacteria. No other species were present on the culture plates.

Reference to the table shows that the tubercle bacilli died out somewhere between the sixtieth and sixty-second days. Even previous to the sixty-second day, there was evidence to show that the number of living tubercle bacilli was small, or else their virulence was much weakened, for the guinea pigs inoculated on the forty-second and fifty-second days were all lightly infected.

Three animals were lost from other infection. The one which died after the inoculation of cheese 7 days old may have obtained the infection directly from the cheese, but the other two cases were probably due to other causes.

A comparison of the results obtained from this true Cheddar cheese with the results of the partly simulated Cheddar made at Berne show that considerable difference exists between the two ; in fact, a difference of thirty-four days in favor of the genuine Cheddar. There are several probable explanations of this difference. The greater acidity developed in the true Cheddar cheese, both during making and subsequent ripening, must have a certain effect on the tubercle bacilli; and the fact that the salt was directly mixed with the curd, instead of being rubbed on the cheese from the outside and then slowly penetrating inward, would also have some influence. The pressure on the properly made cheese was also much greater, and, although this would make no differ-

ence to the bacilli present in the cheese, a much closer texture resulted, and this may have had some effect. All three of these factors might together influence and curtail the duration of life of the tubercle bacilli in Cheddar cheese.

Conclusions Verified and Repeated.

These later experiments fully verified the conclusions first reached and justify this statement: If Cheddar cheese, as commonly made in the United States and Canada, happens to contain tubercle bacilli, naturally present, it may be assumed that none of these germs will be living when the cheese is ten weeks old; hence no danger need be apprehended of acquiring the disease known as consumption by eating well-cured Cheddar cheese.

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4. Ostertag. Milch Zeitung, 22, p. 672.
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Respectfully submitted,

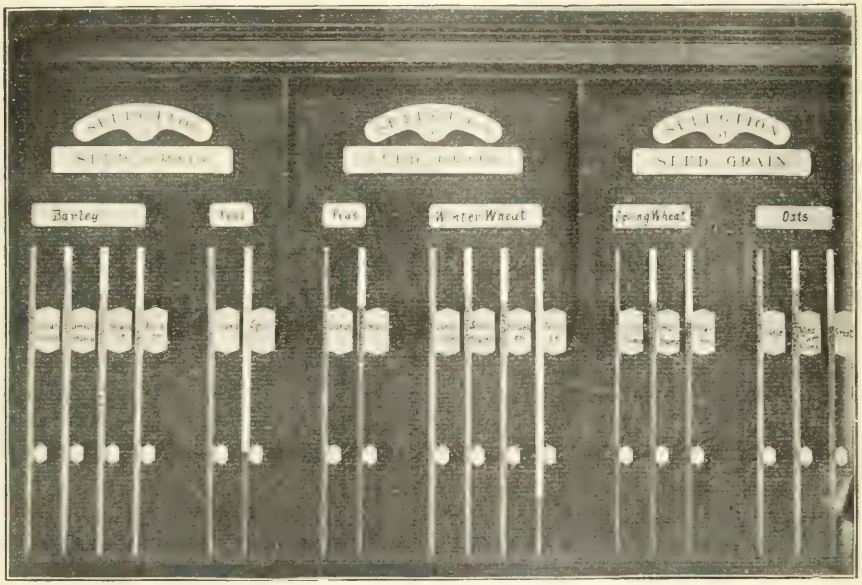
F. C. HARRISON,
Professor of Bacteriology.

PART XIII.

THE EXPERIMENTALIST.

To the President of the Ontario Agricultural College :

Sir,—I have the honor of submitting herewith my report of the work done in the Experimental Department during the year 1903. This is my eleventh annual report since I was placed at the head of the department, and the seventeenth since I first became connected with the College experimental work. During these seventeen years, the experimental plots at the College have been increased from fifty-four to two thousand, and the co-operative experimenters on the farms throughout Ontario from none to three thousand three hundred and forty-five.



View of case in Agricultural Museum, showing results of experiments in selection of seed grain. The yields per acre obtained from the different selections indicated by the labels, are shown by the comparative amounts of grain in the tubes. (See page 118).

Experiments in Field Agriculture or Agronomy.

The work of this department during the past year might be divided in the following manner :

1. The conducting of practical experiments in field agriculture on about 2,000 plots. These plots varied in size according to the requirements of the various experiments, but, in all cases, they were sufficiently large to enable us to ascertain the yields of the various crops under investigation. For the results of this work, the reader is referred to the report which follows.

2. The carrying on of scientific work, the results of which should have a practical as well as a scientific bearing. The subject of plant breeding has received a good deal

of attention. Since the discoveries of Mendel, as well as the investigations of Bateson, De Vries, and Correns, have been made known, this line of work can be followed with greater interest and more encouraging results.

3. The furnishing of plans, seeds, and instructions for illustration plots on the exhibition grounds at Whitby, Renfrew, Owen Sound, Walkerton, Brantford, and Simcoe.

4. The directing of co-operative experiments on 3,345 farms throughout the Province. The co-operative work leads to a substantial increase in farm profits, and also combines in an admirable way the training of the hands and the training of the intellect, and is one of the greatest educational features which have been introduced throughout the rural districts of Ontario in recent years.

5. The delivering of about one hundred lectures to College students and at agricultural conventions. Within the past year, the writer has delivered lectures to about 120 students in the regular College course, 55 students in the dairy course, and 250 students in the two short courses in stock and grain judging. The other lectures which have been delivered since last year are about as follows : Fifteen at meetings of Farmers' Institutes; 12 or 15 in the experimental grounds to the thousands of excursionists who visit the College in the month of June; 4 at Seed Fairs; 7 at the Model Fairs at Whitby, Walkerton, Brantford, and Simcoe; 3 at the Annual Meeting of the Ontario Agricultural and Experimental Union ; 1 at the Broadview Boys' Institute, Toronto; 2 at the agricultural conventions held at the Western Dairy School, Strathroy; 2 in school sections in connection with the proposed establishment of the first Consolidated Rural School in Ontario ; one on co-operative experimental work before the faculty and students in agriculture at Cornell University, Ithaca, N.Y.; 3 at the Annual Meeting of the Provincial Farmers' Association of New Brunswick; 3 at the Annual Meeting of the Provincial Farmers' Association of Nova Scotia; 1 at the Annual Meeting of the Provincial Fruit Growers' Association of Nova Scotia; and 3 at the Annual Meeting of the Fruit Growers' Association of Prince Edward Island.

6 The writing of reports and agricultural articles. (1) Report of the Experimental Department of the College; (2) Report of the co-operative experiments in agriculture in connection with the Ontario Agricultural and Experimental Union ; (3) Miscellaneous articles for agricultural journals, newspapers, etc.

7. The carrying on of a heavy agricutural correspondence. For several weeks in the spring, and again in the fall, the number of letters and cards received averaged more than one hundred daily. Some of these enquiries took much thought and care in answering. The amount of correspondence with Ontario farmers is increasing from year to year.

8. Judging at agricultural exhibitions. During the past year, the writer acted as judge on farm crops at the following agricultural fairs : The Dominion Exhibition, Toronto; the Model Fair, Whitby; the Agricultural Fair, Stratford; the Norfolk Union Fair, Simcoe; the Spring Seed Fair, Guelph; the Spring Seed Fair, Fergus; and the Fall Seed Fair, Guelph. The writer also judged the plots at the Broadview Boys' Institute, Toronto.

Experimental Work at the College.

The practical work in the Experimental Department consists in planning the various experiments ; laying out, seeding, and looking after the field plots; harvesting, threshing, weighing, and testing the grain; taking up, weighing, counting, testing, and storing the potatoes and roots; cutting, weighing, and harvesting the grass, corn, and fodder crops, etc,. and also in picking by hand the samples of grain grown on the plots, some to be sown on the plots the following year, and some to be distributed for co-operative experimental work throughout Ontario. But few people realize what a large amount of very careful thought is required in planning, supervising, and examining these plots, and in studying, comparing, and summarizing the results for presentation in reports, bulletins, newspaper articles, and lectures.

Experimental Grounds. About fifty acres of land, divided into about 2,000 plots, is used for agricultural field experiments, conducted with varieties of grain, root, tuber, grass, clover, fodder, silage, and miscellaneous crops; with artificial, green, and farmyard manures; with methods of cultivation, selection of seed, dates of seeding, etc.,—all with the greatest care, and for several years in succession—in order to secure strictly accurate and reliable results. These experiments deal with the crops grown on over nine-tenths of the cultivated land in Ontario,—that is, fully 10,000,000 acres.

Experimental Plots. The experimental grounds have a gentle slope towards the southwest, and the soil is what might be termed an average clay loam. Nearly one-quarter of the land is manured each year with twenty tons (about twelve loads) of farmyard manure per acre. It will thus be seen that the most of the land receives farmyard manure once every four years. No commercial fertilizers are used, except in distinct fertilizer experiments, which occupy from two to three acres each year, and on which tests are made to ascertain the comparative value of different fertilizers with different crops. The plots vary in size according to the requirements of the different experiments, and the yields per acre are determined from the actual yields of the plots in every instance.

Results of Experiments.

All our field experiments are conducted for at least five years before any of them are dropped. For the results of many of the tests which were carried on for five years previous to 1903, the reader is referred to former reports. The results of some of the experiments which have as yet been conducted for only one or two years are held back until the tests can be carried through at least another summer. As different seasons vary so much in temperature, amount of rainfall, etc., the average results of experiments continued for several years are of much greater value than those secured from only one year's work. We submit the results with much confidence in their reliability, and in their real, practical value. The writer has had good reason to believe that the work of the Experimental Department is being appreciated by the farmers of the Province, and that the results are being studied more and more each succeeding year. I shall limit my remarks on each separate experiment, the results of which are here presented, to a few of the points which seem to be of the greatest value to the agriculture of Ontario.

Weather Conditions During the Past Summer.

In order to study the reports intelligently, it is well for us to know a few points in reference to the weather conditions of the past summer. According to the Report of the Bureau of Industries, the mean temperature for March in 1903 was 37.4 degrees, while that for 1902 was 35 degrees, and that for the average of the last twenty-one years, 25.8 degrees. It will, therefore, be seen that the month of March in 1903 was exceptionally warm. Both April and May of the past season were also somewhat warmer than usual. In June, however, the temperature was about three degrees lower than is usual for that month. In July the temperature was about the same as in the average of the past twenty-one years.

According to the determinations made by the Department of Physics at the College, the rainfall was comparatively light in the early part of the season, but was about normal in May, June, and July.

The first seeding which took place in the experimental plots in 1903 was on the 2nd of April. Most of the grains were sown in April; the mangels, sugar beets, carrots, corn, sorghum, and part of the potatoes in May; and the turnips, rape, millet, beans, and part of the potatoes in June.

Farm Crops in Ontario,

We are indebted to the Reports of the Bureau of Industries for Ontario for the information that the market value of the farm crops grown in the Province in 1902

amounted to $146,421,171, and that the average market value of the farm crops produced in Ontario for the last twenty-one years has amounted to $112,846,470 per annum. This amount represents the combined values of wheat, barley, oats, peas, beans, rye, buckwheat, corn, potatoes, carrots, mangels, turnips, hay, and clover. It is the object of the Experimental Department to conduct such experiments with farm crops, the results of which are likely to exert an influence in increasing both the quantity and the quality of the products of the farms throughout Ontario. Anything which could be done to increase the market value of Ontario's crops one per cent. per annum would add over $1,000,000 increase each year, or sufficient to maintain more than one dozen agricultural colleges similar to the one located at Guelph.

The figures in the table here presented furnish information regarding the principal farm crops grown in Ontario in 1903; the varieties grown in the experimental grounds at the Agicultural College within the past seventeen years; and the number of varieties of each class of crop used in connection with the co-operative experiments throughout Ontario in the past year :

Farm crops.	Acres of each crop in Ontario in 1903.	Number of varieties tested.	
		At O.A.C. within 17 years.	Over Ontario in 1903.
Hay and clover	2,783,565	76	11
Oats	2,645,965	265	3
Barley	709,839	114	5
Winter wheat	666,595	182	3
Corn	588,651	254	9
Peas	407,133	104	4
Spring wheat	252,855	150	3
Rye	179,277	9	.....
Potatoes	138,011	278	5
Turnips	134,717	191	5
Buckwheat	95,487	6	2
Mangels	80,918	113	3
Beans	53,973	41	3
Carrots	7,805	64	2

Besides the crops named in the table, the Experimental Department has also been carrying on careful tests with Emmer, Spelt, Sugar Beets, Parsnips, Kohl Rabi, Sorghum, Sunflowers, Rape, Tares, Artichokes, Flax, Pumpkins, Squashes, Pasture Grasses, etc.

In comparing the areas devoted to the various farm crops throughout Ontario within the past five years, we find the greatest increases to be in mangels (69 per cent.) and barley (62 per cent.) We also find that the greatest decreases during the same period were peas (53 per cent.), Buckwheat (37 per cent.), Carrots (37 per cent.), Winter Wheat (36 per cent.), and Spring Wheat (35 per cent.)

A Comparative Test of Different Classes of Grain.

Much has been done in an experimental way in testing different varieties of nearly all classes of farm crops. But very little, however, has been done to ascertain the comparative yields of leading varieties of the different classes of farm crops under similar conditions. An experiment was conducted at the College in 1902, and again in 1903, in order to obtain some definite information regarding the comparative yields of different classes of farm crops when grown and handled under as nearly uniform conditions as possible. The seeding took place on April 24th in 1902, and on May 5th in 1903, and the experiment was conducted in duplicate each year. The figures here presented give the average results, therefore, of four separate experiments in growing farm crops under similar conditions within the past two years :

Comparative Results of Different Classes of Grain.

Class of crops.	Variety.	Average results for two years—four tests.				
		Date of Ripening.	Height.	Per cent. Rust.	Yield per Acre.	
					Straw.	Grain.
		August.	Inches.		Tons.	Pounds.
Oats	Joanette	12	37	7	2 8	2,693
Barley	Mandscheuri	6	38	11	1.8	2,611
Emmer	Common	22	39	6	2.1	2,556
Hulless barley	Black	5	30	16	1.8	2,298
Early Oats	Alaska	4	41	11	1.9	2,249
Hulless barley	White	8	32	5	1.7	1,995
Spring wheat	Wild Goose	29	45	15	2.2	1,615
Spring rye	Common	17	50	5	2.1	1,423
		Sept.				
Vetches	Spring	6	36	.....	2.0	759

From the results here presented, it will be seen that the Joanette oats gave the largest weight of grain per acre, while the Alaska variety of oats occupied fifth place in this respect. The Mandscheuri barley came second, and Emmer third, in productiveness. Generally speaking, oats have about thirty per cent., and Emmer about twenty-five per cent. of hull. The two varieties used in this experiment, however, have considerably less hull than most varieties of oats. A more detailed description of Emmer is given further on in this report. Of the crops under experiment, the Alaska oats were the earliest, and the Common Vetches were the latest, to mature. The weakest straw was produced by the White Hulless barley and the Alaska oats, and the stiffest straw by the Wild Goose spring wheat. This experiment will likely be repeated for several years.

As some of the same varieties of crops were distributed throughout Ontario in the spring of 1902, and again in 1903, for co-operative experiments, a reference to the results obtained will be interesting for comparison with the results at the College. It should be understood that the crops grown throughout Ontario are the averages of a large number of tests made on separate farms. The average soil on which any one crop would be grown would, therefore, not be exactly the same as the average soil used for the experiments with other crops.

Class of crop.	Variety.	Average yield per acre.			
		Tons of straw 2 years.	Pounds of grain.		
			1902.	1903.	Average 2 years.
Emmer	Common	1.8	2,126	1,810	1,968
Barley	Mandscheuri	1 6	1,672	2,158	1,915
Oats	Siberian	1.7	1,737	1,853	1,796
Peas	Early Britain	1.5	1,166	1,955	1.561
Early Oats	Alaska	1.4	1,398	1,617	1,508
Hulless Barley	Black	1.5	1,536	1,448	1,492
Hulless Barley	White	1.5	1,278	1,248	1,263
Spring Wheat	Wild Goose	1.5	1,302	1,078	1,190

It will be observed from the figures here given that the Emmer produced a greater yield of grain per acre throughout Ontario than any other class of grain, the average yield being 1,968 pounds, while that of the Mandscheuri barley was 1,915 pounds, and that of the Siberian oats, 1,796 pounds per acre.

In connection with the results of experiments conducted with different crops both at the College and throughout Ontario, it is interesting to compare the average production of some of the principal spring crops throughout Ontario as recorded in the Reports of the Bureau of Industries. In taking the average production of farm crops of Ontario for twenty-one years, and also for the past two years, we obtain the following figures :

	Averge 21 years.	Average 1902 and 1903.
Barley	1,272 lbs. per acre.	1,613 lbs. per acre.
Oats	1,200 lbs. per acre.	1,431 lbs. per acre.
Peas	1,164 lbs. per acre.	1,107 lbs. per acre.
Beans	1,040 lbs. per acre.	918 lbs. per acre.
Spring Wheat	942 lbs. per acre.	1,176 lbs. per acre.
Rye	918 lbs. per acre.	983 lbs. per acre.

It will be seen that the yield per acre of nearly all of the farm grains throughout Ontario has been much greater in the average of the last two years than in the average of the past twenty-one years. It will also be observed that the results for the co-operative experiments throughout Ontario are greater than those obtained in general farm practice, and also that the yields at the College are considerably higher than any of the others here presented. It should be remembered, of course, that the results at the College and also those in connection with the co-operative work were obtained from plots, and that the other results were obtained from larger areas of land.

Experiments in Plant Breeding.

A considerable amount of work has been done recently with the object of improving some of the best varieties of farm crops by means of plant breeding. For this purpose, two lines of work have been followed : (1) A systematic method of selection, and (2) A combination of careful selection and artificial cross fertilization. A number of hybrids of wheat, oats, and barley have been obtained, and it is hoped that, in due time, varieties will be secured which are better suited to the conditions of Ontario than even the best kinds in our possession at the present time. This is work, however, which requires much time, patience, and labor before the desired results can be secured.

Influence of Seed Selections Upon the Resulting Crop.

Within the past ten years, a large amount of very careful work has been done to determine the influence of different selections of seed upon the resulting crop. The reader's attention is directed to the results of this experiment, which are becoming more valuable from year to year, owing to the increasing number of times that the experiment has been repeated. Fresh seed has been taken each year from the general crop of grain grown either in the Farm or in the Experimental Department. It will, therefore, be understood that whatever difference there is from the influence of the selection of seed, that difference is attributed entirely to the careful selection of seed for the separate years in which the tests were made. For the large, plump seed, none but well-developed grains were selected; for the small, plump sample the grains selected were of a uniform character; and for the shrunken sample, none but shrunken grains were used, the last selection being made regardless of the size of the kernels. The sample of broken grain, in the case of barley, contained nothing but grains which were broken crosswise; split grain, in the case of winter wheat, contained nothing but grains which were broken lengthwise; and split seed, in the case of peas, contained peas which were split, but not broken. The grain from which these selections were made was all threshed with a grain separator, and the splitting and the breaking of the grains were, therefore, done in the usual process of threshing. In the selection of large plump seed, one-half pound was carefully weighed from each class of grain. The number of large plump seeds of each kind of grain was then counted, and a correspond-

ing number was taken of the medium-sized grain, the small plump grain, the shrunken grain, and the broken grain. The different selections were sown upon plots of similar size. The average results of this experiment are here presented in tabulated form :

Seed Grain Selections.

Class of grain.	Number of years that tests have been repeated.	Selections.	Weight of grain per measured bus.	Average yield per acre. (From 6 to 9 years.) Tons of straw.	Bush of grain (by weight).
Oats	7	Large seed	33.2	1.9	62.0
		Medium sized seed	32.2	1.8	54.1
		Small seed	31.8	1.8	46.6
Barley	6	Large plump seed	49.5	1 5	53.8
		Small plump seed	48 8	1.5	50.4
		Shrunken seed	49 1	1.4	46.0
		Broken seed	48 6	1.3	43 2
Winter Wheat	6	Large plump seed	59.4	2.6	46.9
		Small plump seed	59.2	2 2	40 4
		Shrunken seed	59 1	2.1	39.1
		Split seed	54.2	.6	9.3
Spring Wheat	8	Large plump seed	59.1	1.4	21.7
		Small plump seed	58 3	1.3	18 0
		Shrunken seed	56 9	1.2	16 7
Peas	6	Large seed	56.3	1.3	28 1
		Small seed	56.3	1.1	23 0
	9	Sound seed	58 1	1.4	29.2
		Split seed	57.9	.6	10.2

As the tabulated results indicate so clearly the comparative productions from the different selections of seed, it requires but few words to show the great importance of sowing seed of the best quality. In the average of seven years' experiments, large oats produced about 8 bushels per acre more than medium-sized seed, and an average of 15½ bushels per acre more than small seed. Large plump barley gave a yield of nearly 8 bushles per acre more than that produced from shrunken seed in the average results of experiments repeated for six years in succession. Split peas and broken wheat gave exceedingly poor results, while broken barley produced fully as large yields as one would naturally expect., The broken barley, however, produced more than 10 bushels per acre less than the large plump seed.

Continuous Selection of Seed Oats for Eleven Years in Succession.

For eleven years in succession, an experiment has been conducted in breeding oats by means of selection. The selections made were large, plump, well-developed seeds; light-weighing and light-colored seeds; and also seeds from which the hulls had been removed by the separator. The test was commenced in the spring of 1893 by selecting seed from the general crop of Joanette oats of the previous year. The selection made in each of the following years has been from the product of the selected seed of the previous year. The number of grains used on each plot was carefully counted, and an equal number was used of each selection in the number of years in which this experiment has been conducted. As the selection for this experiment has been continuous, selecting the seed each year from the crop produced in the year previous, the average results are of but little value, but the final results are interesting, valuable and quite suggestive. In the crop produced in 1903, it was found that the large plump seed produced 76.9 bushels ; the light seed, 57.7 bushels; and the hulled seed, 72.2 bushels per acre. As only the best quality of seed becomes hulled, we find that the oats from

Group of students at the close of a practical lesson in grain judging.

which the hulls had been removed gave nearly as good results as the carefully selected, large, plump seed from which the hull had not been removed in the process of threshing. In weight per measured bushel, the crop produced from the large plump seed weighed 7½ pounds more than that produced from the light seed, and about 1-3 of a pound more than that produced from the hulled seed. The difference throughout between the large, plump, well-developed seeds and the light-weighing and light-colored seeds is very marked, and shows the great importance of sowing the former and discarding the latter.

It is interesting to notice that the crop produced from the large plump seed required only 1,208 grains to weigh an ounce, while the crop produced from the light seed required 1,586 grains to make the same weight. The average number of hulled grains per ounce in the crop of 1903 produced from the different selections is as follows: Hulled seed, 238; large plump seed, 220; and light seed, 74. This seems to show that, by sowing hulled seed continuously, there is a tendency to produce oats with a hull which is more easily separated from the kernel in threshing than that which has been grown from unhulled seed.

The Production of Grain and Straw from Different Grain Mixtures.

In an extensive experiment conducted for six years in succession in growing oats, spring wheat, barley, and peas, separately, and in various combinations, for the production of grain and straw, it was found that a mixture of oats and barley gave the highest yield of grain per acre.

Different Proportions of Oats and Barley. Having ascertained that a mixture of oats and barley was well adapted to a large production of grain, it became of importance to know the best proportions of these grains to use in the mixture to give the most satisfactory returns. It was, therefore, decided in the spring of 1900 to conduct an experiment in sowing nine different proportions of oats and barley in order to determine which mixture and which quantity of seed would give the best results in the production of grain and straw. The following gives the amounts of oats and barley per acre used for seed in the different mixtures, and also the number of pounds per acre produced from the different mixtures in the average of four years' experiments:

(1) Oats, ½ bushel, and barley, ½ bushel, yield, 2,250 pounds.
(2) Oats, ½ bushel, and barley, 1 bushel, yield, 2,166 pounds.
(3) Oats, ½ bushel, and barley, 1½ bushels, yield, 2,232 pounds.
(4) Oats, 1 bushel, and barley, ½ bushel, yield, 2,355 pounds.
(5) Oats, 1 bushel, and barley, 1 bushel, yield, 2,347 pounds.
(6) Oats, 1 bushel, and barley, 1½ bushel, yield, 2,338 pounds.
(7) Oats, 1½ bushel, and barley, ½ bushel, yield, 2,231 pounds.
(8) Oats, 1½ bushel, and barley, 1 bushel, yield, 2,271 pounds.
(9) Oats, 1½ bushel, and barley, 1½ bushel, yield, 2,133 pounds.

As this experiment was conducted in three places in the experimental grounds in each of the years 1900 and 1901, and in two places in each of the years 1902 and 1903, the figures here presented give the average of ten separate tests. It is quite evident that the mixtures containing 1 bushel of oats give decidedly better results than the mixtures containing either ½ bushel or 1½ bushels of oats. In 1900, and again in 1901, very excellent results were obtained from 1 bushel of oats and 1½ bushels of barley per acre. In the last two years, however, the best results have been obtained from a lighter seeding of barley, owing, probably, to the comparatively wet seasons of each of the past two years. In 1903, the greatest yield was obtained from 1 bushel of oats and ½ bushel of barley per acre.

Barley and Oats with Some Additional Variety of Grain. In 1902, and again in 1903, an experiment was conducted in duplicate in order to ascertain whether the seed mixture of 1 bushel of oats and 1½ bushels of barley per acre could be improved by the addition of a small quantity of some other kind of seed. In addition to the oats

and barley, ½ bushel of grain was used in each mixture. The average results of the two tests for each of the years 1902 and 1903 are as follows : (1) Oats and barley, 2,607 pounds; (2) Oats, barley and spring wheat (Wild Goose), 2,657 pounds; (3) Oats, barley, and Emmer, 2,673 pounds; (4) Oats, barley, and hulless barley (black), 2,601 pounds; (5) Oats, barley, and flax, 2,627 pounds, and (6) Oats, barley, and grass peas, 2,591 pounds. It will, therefore, be seen that the highest yield was produced from oats, barley, and Emmer, and the lowest yield from oats, barley, and grass peas.

Methods of Cultivation.

In each of the past three years, an experiment has been under way in comparing different methods of cultivation, for both oats and barley. The experiment was conducted in duplicate in each year. The results which follow, therefore, represent the average of six separate tests : (1) Cultivated six inches, drilled, rolled, and harrowed,—average yield per acre : Oats, 56.4 bushels, and barley, 44.9 bushels ; (2) Cultivated three inches, drilled, rolled, and harrowed,—average yield per acre : Oats, 56.8 bushels, and barley, 43.2 bushels ; (3) Cultivated three inches, drilled, and rolled,—average yield per acre : Oats, 58.6 bushels, and barley, 46.2 bushels ; and (4) Cultivated three inches and drilled,—average yield per acre : Oats, 54.5 bushels, and barley, 42.4 bushels. It will be observed that the land which was cultivated three inches deep and was then drilled and rolled gave the largest yield of grain per acre of both oats and barley. It should be remembered that the summers of 1902 and 1903 were comparatively wet and cool. The soil on which this experiment was conducted was what might be termed as average clay loam. This experiment will likely be repeated for several years.

Treatment for Smut in Oats and Winter Wheat.

Many enquiries have been made by Ontario farmers regarding the treatment of smut in both oats and wheat. As different treatments are recommended for smut in each of these grains, experiments have been conducted at the College for two years with oats and for four years with winter wheat in order to ascertain the most effectual remedies which can be used in Ontario.

Treatment of Oats for Loose Smut. Two varieties of oats were selected in the spring of 1902, and again in the spring of 1903, and uniform samples of each variety were submitted to special treatments, with the object of killing the spores of smut adhering to the grain. The various treatments were as follows :

(1) Immersion in Hot Water. For this treatment, the grain was placed in a bag, which was then immersed in water at about 115 degrees F. Soon afterwards it was placed in water which was kept at a temperature between 130 degrees and 135 degrees F. The grain was occasionally stirred and was allowed to remain in the water for a period of fifteen minutes. It was then spread out on a clean floor to dry, where it was stirred occasionally.

(2) Immersion in Bluestone Solution for five minutes. For No. 2 treatment, a strong solution was made by dissolving one pound of Copper Sulphate (Bluestone) in one gallon of water, and then immersing the oats in the solution for a period of five minutes.

(3) Immersion in Bluestone Solution for twelve hours. In this treatment, the bluestone solution was made by dissolving one pound of bluestone in 25 gallons of water, and the oats were immersed in this solution for a period of twelve hours.

(4) Sprinkling with Bluestone Solution. This solution was made by dissolving one pound of bluestone in 10 gallons of water, which was used for sprinkling over the oats until they were thoroughly moistened after being carefully stirred.

(5) Immersion in Potassium Sulphide Solution. The potassium sulphide treatment consisted in soaking the seed for two hours in a solution made by dissolving 8 pounds of potassium sulphide in 50 gallons of water.

(6) Immersion in Diluted Formalin. The solution of formalin used for the immersion process was made by pouring one-half pint of the formalin into 21 gallons of water, and the seed oats were immersed in the solution for twenty minutes.

(7) Sprinkling with Diluted Formalin. One-half pint of formalin was poured into 5 gallons of water. The oats were then sprinkled with this solution and carefully stirred until the grain was thoroughly moistened.

(8) Untreated. One sample of oats of each variety was left untreated in order that the influence of the various treatments might be observed.

Eight lots of oats of each variety were, therefore, used for this experiment. After the treatments had been completed a few hours, the oats were carefully sown on separate plots. Each plot was exactly one rod square in size. When the oats were coming into head, they were examined frequently, and all smutted heads removed and carefully counted. The four separate tests have been averaged, and the following table gives the results in the percentage of smutted heads of oats from each treatment :

Treatments.	Percentage of Smutted Heads.	
	1903.	Average of 2 years.
1. Immersion in hot water	.0	.0
2. Immersion in bluestone solution for five minutes	.9	1.3
3. Immersion in bluestone solution for twelve hours	.0	.3
4. Sprinkling with bluestone solution	2.0	1.4
5. Immersion in potassium sulphide solution	.1	1.7
6. Immersion in diluted formalin	.0	.0
7. Sprinkling with diluted formalin	.0	.0
8. Untreated	3.9	4.7

The treatments with hot water, formalin, and twelve hours immersion in bluestone solution gave the best results in each of the two years. The formalin treatment is easily performed, comparatively cheap, and very effectual. The untreated seed had an average of 4.7 per cent. of smutted grain. That would amount to a loss of about 25 bushels in a ten-acre field of oats. In those seasons in which the smut is very bad, the treatment would likely prevent a much greater loss than here indicated.

Treatment of Winter Wheat for Stinking Smut. Winter wheat infested with smut has been treated in different ways in each of four years. The crop produced in each year from the various treatments was carefully examined. The following gives the average for the four years :

Untreated ..... 456 smut balls per pound of wheat.
Potassium Sulphide ..... 11 smut balls per pound of wheat.
Copper Sulphate ..... 2 smut balls per pound of wheat.
Hot Water ..... 1 smut ball per pound of wheat.

The copper sulphate (Bluestone) treatment consisted in soaking the seed for twelve hours in a solution made by dissolving one pound of copper sulphate in 24 gallons of water, and then immersing the seed for five minutes in lime water, made by slacking one pound of lime in 10 gallons of water. The hot water treatment consisted in immersing the wheat for fifteen minutes in water at 132 degrees F. After each treatment, the grain was spread out and stirred occasionally until dry enough to sow.

Influence of Different Latitudes on Seed Oats and Seed Wheat.

Arrangements are made by which the Missouri Agricultural Experiment Station and our College exchange seed wheat and seed oats yearly, with the object of studying the

influence of environment on the production of seed grain. The final results of this experiment cannot be obtained for several years. The results of past experiments have generally shown that the southern grown oats have produced the largest yield of grain, and that the Ontario seed produced grain of the best quality. The Dawson's Golden Chaff seed wheat grown in Ontario has given slightly better results in 1902-3 than that imported from the State of Missouri.

Grains Sown at Different Dates.

It is certainly surprising that so little has been done in the past with the object of obtaining reliable information regarding the best date to sow our various grain crops in order to secure the greatest production of the best quality. It is true that seasons vary, but data obtained from experiments carried on for a number of years furnish information which becomes exceedingly valuable as a general guide. The results which follow have been obtained from experiments conducted at the College :

Winter Wheat. Two varieties of winter wheat have been sown on different dates in the autumn for a period of nine years, and the average results show that the wheat which was sown during the last week in August, or the first ten days in September, yielded better than that sown at a later date. In 1903, the highest average yield was obtained from sowing on September 9th, 1902.

Ordinary Spring Grains. For six years in succession, an experiment has been conducted by sowing spring wheat, barley, oats, and peas, on six different dates in the spring of the year. The first seeding took place as soon as the ground was sufficiently warm and dry to work to good advantage. One week was allowed between each two seedings. The average results go to show that the largest yields of grain were obtained from the first seeding with spring wheat, and from the second seeding with barley, oats, and peas. The results indicate the importance of sowing spring wheat, barley, oats, and peas in the order here given, starting with the spring wheat and finishing with the peas. After the first week was past, however, there was an average decrease in yield from every day's delay in seeding of 56 pounds of oats, 53 pounds of barley, 29 pounds of spring wheat, and 23 pounds of peas per acre.

Spelt and Emmer. Although both of these classes of grain are, in reality, different species of wheat, we present the results under a separate heading. Both spelt and emmer were sown on eight different dates in the spring of 1903, starting on April 2nd and finishing on May 21st, and allowing one week between each two dates of seeding. The results of the experiment are given in the table here presented :

Dates of Seeding. 1903.	Lbs. per Measured bus.		Tons of Straw per acre.		Lbs. of grain per acre.	
	Spelt.	Emmer.	Spelt.	Emmer.	Spelt.	Emmer.
April 2nd	28.8	39.6	2.3	2.5	34.99	42.97
" 9th	27.9	37.9	2.0	2.6	30.61	39.78
" 16th	28 0	38.1	2.3	2.5	25.70	36.94
" 23rd	25.4	36.9	2.1	2.7	17.13	37.25
" 30th	26.4	36 9	2.1	3.0	16.58	40 67
May 7th	25.7	37.4	2.1	2.6	14.28	32.19
" 14th	24 0	37.0	1.9	2.7	9.61	31 77
" 21st	27.5	36 6	1.8	2.9	6.58	31.03

The results of the experiment conducted in 1903 show that the emmer produced straw which yielded more abundantly, and grain which weighed heavier per measured bushel and yielded more per acre, than that of the spelt from each of the dates of seeding. It will also be observed that the emmer gave good results throughout the whole season, furnishing 4,297 pounds of grain per acre from the first seeding, and

3,103 pounds of grain per acre from the last date of seeding. In the case of the spelt, however, the results are very different. There was a rapid decrease in the yield of grain per acre from the first to the last date of seeding, there being 3,499 pounds from the first, and 658 pounds from the latest date on which the grain was sown. These figures seem to indicate that the emmer not only surpasses the spelt in yield of grain per acre from the first date of seeding, but will permit much later seeding than the spelt. This experiment will likely be repeated for several years.

Winter Wheat Seed Per Acre.

From sowing, one, one and one-half, and two bushels of winter wheat per acre for each of six years, average yields of 40.2 bushels, 43.3 bushels, and 43.9 bushels per acre, respectively, were obtained. As two varieties of wheat were used each year, these averages represent twelve distinct tests.

Methods of Sowing Winter Wheat.

Winter wheat which was sown broadcast by hand gave practically the same results as that which was drilled in with a machine in the average results of tests made in each of eight years. The land was in a good state of cultivation in every instance.

Preparation of the Land for Winter Wheat.

In an experiment conducted for four years, winter wheat grown on land on which a crop of field peas was used as a green manure, produced an annual average of 22.1 per cent. more wheat per acre than on land where a crop of buckwheat was plowed under. In another experiment which was carried on for one year, winter wheat grown on land prepared from clover stubble produced 20.7 per cent. more wheat per acre than on land prepared from timothy stubble. In a two years' test with commercial fertilizers, an application of 160 pounds of nitrate of soda per acre increased the yield of wheat 18.8 per cent., or 7.2 bushels. The present price of nitrate of soda is about $60 per ton.

Winter Wheat Cut at Different Stages of Maturity.

For seven years in succession, five plots of each of two varieties of winter wheat were sown at the same time in the autumn, and cut at five different dates in the following summer—a week being allowed between each two dates of cutting. Seed from each of the seventy cuttings was sown, and the crop therefrom was harvested when ripe. In the average results of these tests, it is found that the heaviest weight of grain per measured bushel and the largest yield of both grain and straw were produced from seed taken from the crops which had become very ripe by remaining uncut for the longest period of time.

Varieties of Wheat.

We have sometimes heard the remark that grain growing in Ontario is largely a thing of the past, owing to the development of the live stock and dairy industries. This statement is apt to be very misleading, as there is actually about 15 per cent. more grain grown at the present time than there was ten years ago. The great change has not been so much in the amount of grain which is grown as in the method of handling the crop after it is secured. Formerly a large amount of grain was sold from the farm, while, at the present time, a greater proportion is fed to live stock, and the sales which are made are principally those of farm stock and dairy products. This change in method has also brought about a change in the relative amounts of the different grains grown in Ontario. The area devoted to the growth of those

IMPERIAL AMBER WINTER WHEAT.
(*Triticum vulgare.*)

RED FIFE SPRING WHEAT.
(*Triticum vulgare.*)

POLISH SPRING WHEAT.
(*Triticum Polonicum.*)

WILD GOOSE SPRING WHEAT.
(*Triticum durum.*)

a. Front of grain. *b.* Side of grain. *c.* Back of grain. *d.* Empty glume. *e.* Flowering glume. *f.* Palet.

crops which can be used to the best advantage as feed for farm stock has been increased, and that used for the growing of those crops which are more suitable for selling directly from the farm has been decreased. Hence we can probably see the reason why there has been a decrease within the last five years of 36 per cent. in the area devoted to winter wheat growing, and of 35 per cent. in the area devoted to spring wheat growing in Ontario. Even after this decrease, we find that there were nearly a million acres under wheat in Ontario in 1903.

RED SPELT.
(*Triticum spelta.*)

COMMON EMMER.
(*Triticum dicoccum.*)

a. Front of grain. *b*. Side of grain. *c*. Back of grain. *d*. Front of spikelet. *e*. Side of spikelet.

The wheat plant appears to have been known and valued from the earliest times, as it will thrive successfully in a great range of climate, the inhabitants of many countries enjoying the advantages of its cultivation. Most authorities classify wheat into seven distinct types, which include all varieties. The seven types are as follows :

(1) Common, fine, or soft wheat (Triticum vulgare).
(2) Turgid or toulard wheat ,Triticum turgidum).
(3) Hard or flinty wheat (Triticum durum).
(4) Polish wheat (Triticum polonicum).
(5) Spelt (Triticum spelta).
(6) Starch wheat (Triticum dicoccum).
(7) One-rowed wheat (Triticum monococcum).

Representatives of all these different classes have been grown in our experimental grounds, although practically nothing is known throughout the Province about varieties of either turgid wheat or the one-rowed wheat. Considerable, however, has been said in reference to representatives of each of the other classes.

Common Wheat (Triticum vulgare). This class represents the greatest number of the varieties of both winter and spring wheats which are grown in Ontario for flour production.

The winter wheat crop of the present year has been unusually good. The yields have been high and the quality of the grain has been excellent, some of the varieties weighing as much as 63.8 pounds per measured bushel. The rust did not cause any serious damage, and the Hessian fly has apparently disappeared for the present.

Upwards of two hundred varieties of winter wheat have been grown at the College within the past fourteen years. The most of these have been grown for at least five years in succession. The following figures represent the average results for five years of some of the best varieties in yield of both straw and grain per acre, and in weight of grain per measured bushel:

Varieties.	Color of grain.	Tons of straw.	Pounds per bus.	Bushels per acre.
Dawson's Golden Chaff	White	4.2	59.7	63.5
Imperial Amber	Red	4.4	61.0	61.0
Prize Taker	White	4.2	59 0	60.3
Early Genesee Giant	White	4.5	59.9	60 1
Rudy	Red	3.9	61.0	57.7
McGarvin	Red	3.9	61.1	57.7
Egyptian Amber	Red	4.6	61.8	57 5
Early Red Clawson	Red	4.1	59.4	57.4
White Golden Cro s	White	4.5	58.9	57 3
Buda Pesth	Red	3.9	61.3	57 2
Michigan Amber	Red	4.6	60.2	55.4
Treadwell	White	4 0	61.0	54.2
Turkey Red	Red	3.7	61.5	53.4
Bulgarian	White	3 9	61.1	53.0

It will be seen that the Imperial Amber stands second in average yield of grain per acre, and is a close rival to the Dawson's Golden Chaff in grain production. It has a bearded head, red chaff, and a red grain. A drawing of the head, grain, and chaff of the Imperial Amber is presented in this report.

The Dawson's Golden Chaff produces stiff straw and soft grain, and the Turkey Red, weak straw and hard grain. We have made several crosses between these two wheats, and hope to secure a new variety with the productive power and the stiffness of straw of the Dawson's Golden Chaff, and the quality of grain of the Turkey Red.

In 1902, Ontario millers were desirous to have the Turkey Red, Michigan Amber, Early Genessee Giant, and Bulgarian varieties of winter wheat grown throughout the Province, owing to their superior milling qualities.

The varieties of winter wheat which we have grown for less than five years, and which produced the greatest yields of grain per acre in 1903, are as follows: (1) New American Banner, (2) Abundance, (3) No. 6, (4) Cap Sheaf, (5) Silver Dollar, (6) Paramount, (7) Forty-fold, (8) Superlative, (9) Prosperity, (10) Winter King, (11) Fultzo-Mediterranean, and (12) Banatka.

In spring wheat for flour production, the average results of five years' experiments with fifteen varieties show that the Pringle's Champion stands at the top of the list, and the Red Fife next to the top in yield of grain per acre. These two varieties have given an average of 37.9 and 37 bushels of grain per acre, respectively. The Red Fife, which has been grown in Ontario more or less for a good many years, and which is sown so extensively in Western Canada, is one of the best varieties of spring wheat for flour production which we have grown at the College. In those sections of Ontario where spring wheat can be grown successfully, the Red Fife variety seems about as likely to give satisfactory results in both yield of crop and quality of grain as any other variety of the common spring wheats which we have tested for a series of years. The reader is referred to a drawing of the head, grain, and chaff of the Red Fife spring wheat, which is given in this report.

Hard or Flinty Wheat (Triticum durum). This class includes a number of varieties of wheat which are frequently used for the manufacture of macaroni. Some seven varieties in all have been grown at the College for at least five years in succession. The greatest average yield during the five years has been obtained from the Wild Goose variety, which produced slightly over 41 bushels of grain per acre. The Sorentino comes second with 38 1-2 bushels, and the Medeah third with 37 bushels per acre. In weight per measured bushel, the Wild Goose also occupies highest place, the average for the five years being 62 pounds. For fuller information in reference to Wild Goose spring wheat, the reader is referred to the accompanying cut, and to the remarks under the next heading, where this variety is compared with the Polish wheat.

Polish Wheat (Triticum polonicum). A cereal under the name of "Corn Wheat" is being extensively boomed in the Western States at the present time. As many extravagant claims are made for this grain, it is quite natural that our own people should be enquiring about this peculiar wheat, and wondering if it would produce such immense crops in Canada. From enquiries which we have made, we learn that the so-called "Corn Wheat" is no other than the grain known in various countries by the name of Polish Wheat (Triticum polonicum). This name has been changed to "Giant Rye," in Colorado, and now to "Corn Wheat" in Idaho.

The Polish Wheat is grown more or less in Egypt, Algiers, Spain, Italy, and Eastern Europe, and to a very limited extent in America. The straw is of medium length and is almost solid. The heads are large, and the outer chaff projects beyond the inner chaff in a peculiar manner. The grains are about one and one-half times as large as those of the Wild Goose spring wheat, and are hard, transparent, and suitable for the manufacture of macaroni.

We first grew the Polish Wheat at the Ontario Agricultural College, Guelph, in 1889. Careful tests of its comparative results along with other varieties have been made for at least nine years. As the Wild Goose spring wheat is the best known macaroni wheat in Eastern Canada, I submit the comparative yields of these two varieties as grown under similar conditions at the Ontario Agricultural College in each of nine years. The following table gives the number of weighed bushels (60 pounds) produced by each variety in each of the years indicated :

Years.	Polish Spring Wheat.	Wild Goose Spring Wheat.
	bus.	bus
1889	11.7	26.7
1890	8.9	12.9
1897	16.3	23.1
1898	27.1	48.3
1899	24.5	44.5
1900	34.5	48.4
1901	15.6	32.1
1902	29.1	33.5
1903	32.8	46.7

In the average results for the nine years, we find that the yield of the Polish Wheat was 22.3 bushels, and that of the Wild Goose was 35.1 bushels per acre. The Wild Goose variety, therefore, gave an average yield of 57.4 per cent. more than that of the Polish Wheat. The average weight per measured bushel of the Wild Goose wheat was 62.1 pounds, and that of the Polish Wheat was 56.5 pounds. The light weight per measured bushel of the Polish Wheat is largely due to the fact that the grains are very long and large, and do not lie closely together when in bulk. The Polish Wheat ripens about one day earlier than the Wild Goose variety, and possesses straw which measures two inches shorter, and weighs about one-third of a ton per acre less per annum than the latter wheat. The Polish Wheat usually stands up

fairly well, but the straw is more subject to rust than that of the Wild Goose. The peculiarities of the head, grain, and chaff of the Polish Wheat can be seen from the accompanying illustration (see page 126).

We have never distributed the Polish Wheat for co-operative testing among the farmers, the reasons for which are possibly apparent to the reader after a perusal of the foregoing results.

Spelt (Triticum spelta). Spelt is a cereal which in appearance is intermediate between wheat and barley, but, in reality, is one of the types into which wheat is divided. It is a native of the countries near the Mediterranean Sea. At the present time it is grown principally on the poorer soils in Switzerland, Southern Germany, and Northern Spain. It is also grown at an elevation in Switzerland where the common wheat (Triticum vulgare) will not thrive. For general cultivation it is considered much inferior to the finer varieties of wheat. The head is open, narrow, bearded or bald, and is usually very long. When the grain is threshed, the head breaks into pieces at the different joints, or nodes, leaving the grain still clasped firmly by the chaff. In order to make a separation of the chaff from the seed, special machinery is required. The grain is medium hard, and somewhat compressed at the sides. The grain in Ontario frequently called Spelt belongs to the Emmer class, and is, therefore, improperly named.

To find out the value of Spelt for growing in Ontario, we have imported at different times no less than ten varieties from Switzerland, Russia, Germany, the Argentine Republic, and the United States. Two of these varieties proved entire failures, two others gave poor results, and the other six varieties yielded moderately well. As the grain is enclosed by a chaff somewhat similar to oats, and weighs less than 40 pounds per measured bushel, the results here presented are given in pounds, instead of bushels of grain per acre. One of the best varieties of Spelt has now been grown in the experimental plots for five years, and has given an average yield of 1,623 pounds of grain per acre. For further particulars in reference to Spelt, the reader is referred to the accompanying drawing, and also to the results under the next heading.

Emmer (Triticum dicoccum). Emmer is a cereal which represents a different type of wheat from any of those already described in this report. It is grown in Russia, Germany, Switzerland, Spain, France, Italy, and to a slight extent in some other countries. In Russia, alone, about sixteen million bushels are produced annually.

As in the case of Spelt, the grain of the Emmer is tightly enclosed within the chaff, from which only a small portion is separated, even in the process of threshing. In comparison with Spelt, however, the heads are much shorter and more compact, and the grain is more triangular in form and very much harder. The spikelets of the Emmer overlap each other like shingles on a roof, which makes the head close, smooth, and regular. The heads are nearly always bearded, and the chaff is usually harder than that of the Spelt. The portion of the stem adhering to the spikelets after threshing is much smaller and more pointed in the Emmer than in the Spelt. The spikelets of the Emmer are flattened on the inner side, while those of the Spelt are arched. Emmer is considered a very hardy plant, being much superior to the Spelt in this respect. The comparative difference between Spelt and Emmer can be plainly seen by the drawings shown on another page. These drawings may reveal to some people in Ontario the fact that the grain which they have been growing under the name of Spelt is, in reality, Emmer, a cereal which is quite distinct from Spelt.

Emmer has been grown in the Experimental Department for four years, and has produced very heavy yields of grain per acre. The yields in each of the past four years for the common variety of Emmer are as follows: 1900, 2,608 pounds; 1901, 2,122 pounds; 1902, 2,252 pounds; and 1903, 3,924 pounds, thus making an average of 2,727 pounds per acre. The weight per measured bushel was 43.8 pounds in 1900,

33.8 pounds in 1901, 36.6 pounds in 1902, and 36.6 pounds in 1903, the average being 37.7 pounds. It will be seen that the average yield of Emmer per acre for the four years has been fully 72 bushels per acre by measure.

Emmer was distributed for co-operative experiments throughout Ontario in 1901, 1902, and again in 1903, and the yields produced throughout the Province were very large, being higher than the average yields of the best varieties of oats or barley.

The following table gives the average results of two years' experiments in growing four varieties of Spelt and three varieties of Emmer under similar conditions :

Classes of crop.	Varieties.	Average results for two years.					
		Percentage of			Pounds per bu. one year.	Yield per acre.	
		Rust	Crop lodged.	Hull with grain.		Tons of straw.	Pounds of grain.
Emmer	Common	2	12	23	36.6	2.6	3,474
	Iowa	2	11	22	38.4	2.3	3,235
	Russian	2	8	23	37 0	2.2	3,143
Spelt	Red	15	5	30	27 6	2.2	2,374
	Alstroum	18	5	30	27.5	1.8	2,174
	White	16	3	30	28.4	1.7	2,050
	Dasyanthum	19	25	37	28.0	2.1	1,902

The table here presented shows some very interesting results. The straw of Emmer is very clean, being almost free from rust, while that of Spelt is quite subject to the attacks of this fungus. As a rule, however, the Emmer is a little weaker in the straw than the Spelt, although the Dasyanthum variety of Spelt is decidedly weaker than any variety of Emmer which we have had under experiment. It will also be observed that the majority of varieties of Emmer contain only 23 per cent., while those of Spelt contain about 30 per cent. of hull. As the average hull on oats is about 30 per cent., it will be seen that Emmer, as a class, has decidedly less hull than either Spelt or oats. According to the results of the past two years, the average weight per measured bushel of Emmer was about 10 pounds greater than the average weight per measured bushel of the Spelt. Although there is not much difference in the length of straw of the two classes of grain, it will be seen that the Emmer produces a little heavier weight of straw per acre than is obtained from the Spelt. From the last column in the table, in which the average yield of grain of each variety of Emmer and of each variety of Spelt is given, it will be seen that the poorest variety of Emmer has given 769 pounds per acre more than the best variety of Spelt. In all experiments which we have made at the College, every variety of Spelt has been surpassed in yield of grain per acre by every variety of Emmer.

As the results of all experiments which we have yet conducted with these two classes of grain, we find the Emmer to be decidedly the most promising to grow in Ontario. As it requires special machinery for separating the hull from the grain of Emmer, and as the grain when ground makes rather a coarse flour, it is likely that this grain will not be grown in Ontario extensively for flour production. It is quite probable, however, that it will be grown considerably for the producton of good, clean straw, and a large yield of grain to be used as a food for live stock. For feeding purposes, the grain and the surrounding chaff are usually ground together in the same manner as oats are ground into meal.

Winter Rye.

Two varieties of Winter Rye have been grown for five years in succession, and the following average yields of straw and grain per acre have been obtained : Mam-

moth, 4 tons straw, 60.8 bushels grain ; and Common, 4.1 tons straw, and 57.2 bushels grain.

Spring Rye.

The average yields per acre of the Dakota Mammoth and Prolific Spring varieties of rye for six years, and the Common Rye for five years, are as follows : Dakota Mammoth, 39.5 bushels ; Prolific Spring, 36.5 bushels ; and Common Rye, 35.9 bushels. The weight per measured bushel in the same experiment we find to be 57.9 pounds for the Dakota Mammoth, 57.1 pounds for the Prolific Spring, and 56.6 pounds for the Common. The results of experiments carried on with both Winter Rye and Spring Rye seem to show that the average results in yield of grain per acre are decidedly in favor of the Winter Rye.

Winter Barley.

Winter Barley has been tested for ten or twelve years. It is more tender than winter wheat, becoming completely killed out in some years. When it survives the winter, however, it usually gives a very high yield of grain, the average for seven years being 68.7 bushels per acre.

Varieties of Spring Barley.

Barley is one of the hardiest of the cereals, and can be raised through a great range of climate. It is cultivated with success north of the Arctic circle, and at high altitudes in the torrid zone. In 1903 no less than 709,839 acres were devoted to this crop in the Province of Ontario.

Six-rowed Barley. In the five years from 1889 to 1893, eighty-six different varieties of barley were grown in the experimental grounds. After five years' tests were completed, the poorest varieties were dropped from the experiment, and those which proved the most successful were retained for future experiments. New varieties were added from time to time, all of which were tested for at least five years. In the average results of ten years' experiments with each of nine different varieties of six-rowed barley, we find yields as follows : Mandscheuri, 70.9 bushels ; Oderbrucker, 66 bushels ; Scotch Improved, 66.2 bushels ; Common Six-rowed, 65.5 bushels ; Mensury, 63 bushels ; and Success, 47.8 bushels per acre. Although a great deal has been claimed for the Success barley, which is an early variety and free from beards, we find that in the average of the last ten years it has produced fully 20 bushels per acre less than the Mandscheuri variety. In the average results for the last five years, we find that the California Brewing, Mandscheuri, Common Six-rowed, Oderbrucker, and Scotch Improved have been the best yielding six-rowed barleys. Some new varieties imported from Great Britain and Germany, and grown in our trial grounds for one or two years, are promising.

Two-rowed Barley. The two-rowed barley is easily distinguished from the other species by the head being more elongated, and by their being two distinct rows of grain from one end of the head to the other. The heads of some varieties are long and slender, while those of other varieties are short, very broad at the base, and taper towards the extremity. The two-rowed barley is largely cultivated in England and in Central Europe, but it is not grown to any great extent in Ontario, although great efforts were made a few years ago by the Dominion Government to have it grown more extensively by Canadian farmers for exporting to England. With this object in view, the Canadian Government imported 10,000 bushels of the Carter's Prize Prolific barley from England, and sold the same to Canadian farmers at $2 per bushel in order to get it introduced.

About sixty varieties of two-rowed barley have been grown in our experimental grounds at the College. According to the results of several years' experiments,

we find that the highest yielding two-rowed barleys are not as productive as the most prolific varieties of the six-rowed class. In the average of ten years' results with eight varieties of two-rowed barley, we find the greatest yields produced by the two-rowed Canadian, Vermont Champion, Gold Foil Hansford, New Zealand Chevalier, and French Chevalier. In 1903, the greatest yields of two-rowed barley were produced from two varieties which came through the United States Department of Agriculture, namely, Imported No. 5,591 and Hanna No. 5,590. Some English and German varieties imported by the College are also promising. The Chevalier Two-rowed barley has been used considerably in mixing with Siberian or Banner oats for seed purposes. As the Chevalier barley is late in maturing, it ripens about the same time as either of these varieties of oats, and a mixture composed of these grains usually produces a heavy yield per acre.

Hulless Barley. A considerable amount of Hulless barley is grown in some parts of Ontario, especially in those sections where the pea weevil (pea-bug) has been doing serious damage to the pea crop in recent years, and where farmers are using the Hulless barley as a partial substitute for the pea crop. The yield of grain of the Hulless barley is usually very good, but, generally speaking, the straw is weak. When sown with oats, however, the crop seems to stand up rather better than when sown alone. The standard weight per measured bushel of Hulless barley is 60 pounds.

Eight varieties of Hulless barley have been grown in the experimental grounds at Guelph in each of the past ten years, and the highest average yields were obtained from the following varieties : Guy Mayle, 48.8 bus.; Black Hulless, 45.6 bus.; and Purple, 45.2 bushels per acre. In the average results for the past five years, we find the greatest yields were obtained from the Guy Mayle, 52.6 bus.; Black Hulless, 50 bus., and Purple, 48.1 bushels per acre. These three kinds of Hulless barley are among the best varieties which we have tested at the College.

Varieties of Oats.

The wide range of soils on which oats grow to advantage, and the comparatively low temperature in which they come to their maturity, have rendered them well adapted for cultivation in many countries. In Scotland, we find oats cultivated to its northern extremity, and in Norway they grow as far north as latitude 65 degrees.

The area devoted to oats in Ontario annually, is about equal to that used for all the other cereals combined.

We have had in our experimental grounds at the College no less than two hundred and sixty-five different varieties of oats, in order to secure information as to the most suitable varieties for general cultivation throughout the Province. In the average results for fifteen years of eight different varieties of oats, we find the greatest yields obtained from the Joanette, 88.9 bus.; Siberian, 87.2 bus.; and Oderbrucker, 81.5 bushels per acre. The Joanette oats, possessing a very short straw, are unsuitable for growth throughout the greater part of the Province. On rich soils, however, where they are sown very thinly, cut a little on the green side, and bound into small sheaves, they are grown with great satisfaction by some farmers. They are the greatest stooling oats and possess the thinnest hulls of all the varieties which we have had under experiment at the College. For general cultivation throughout the Province, however, the Siberian and the American Banner varieties are two of the most popular. The Siberian seems to give the best results in some localities, and the American Banner in others. In the average results of experiments with twenty-five varieties of oats for the past five years, the greatest yields have been obtained from the Siberian, Liberty, American Banner, German, Rust-Proof, and Michigan Wonder, in the order here indicated. Among the newer varieties of oats, the Liberty and Sensation are promising for general cultivation; the Daubeney and Alaska for very early maturity, suitable for growing by themselves in Northern Ontario, or for mixing with barley in

Southern Ontario; and the Tartar King where a stiff coarse straw is specially desirable.

Varieties of Corn for Grain.

In spite of the fact that the number of silos throughout Ontario has been increasing from year to year, we find that the area devoted to corn for husking is also increasing throughout the Province. In 1903, 378,924 acres were used for the cultivation of corn for the production of grain. This was the greatest amount of Ontario land ever used for this purpose.

In the average of four years' experiments in growing nine early varieties of corn for grain production, we have obtained the following yields of shelled grain :

King Phillip	58.1 bus. per acre.
Farmer's Friend	54.2 bus. per acre.
Longfellow	53.5 bus. per acre.
Genesee Valley	52.6 bus. per acre.
Canada Yellow	47.7 bus. per acre.
Red Blazed	46.9 bus. per acre.
Burlington Hybrid	45.0 bus. per acre.
Salzer's North Dakota	43.2 bus. per acre.
Compton's Early	41.6 bus. per acre.

The King Phillip variety, which stands at the head of the list in yield of grain per acre, also gave the highest yield of grain in the co-operative experiments throughout Ontario in 1903. The North Star Yellow Dent variety, which gave excellent results in grain production at the College in 1900, 1901, and again in 1902, did not fully mature in the past year.

Varieties of Millet for Seed.

In each of six years, different varieties of millet were grown and ripened, and the yield of seed of each carefully determined. In the average results for these years, it is found that the California and the Siberian varieties, and also the Hungarian Grass, have all produced large yields. The Japanese Panicle millet has usually made high records in yield of seed per acre, but, through the unfavorable weather of the last two years, it has not given quite as good results as it has in other years when the weather was both warmer and drier.

Varieties of Field Peas.

Owing to the severe ravages of the pea weevil (pea bug) in the southern part of Ontario, it has been thought wise to drop experiments with field peas both at the College and throughout the southern part of Ontario, with the hope that farmers generally will follow the example and quit growing peas entirely for a period of two years. For fuller information in reference to this interesting subject, the reader is referred to a bulletin prepared by Prof. Lochhead and myself, and issued by the Department of Agriculture, copies of which can be procured by writing to the Department of Agriculture, Parliament Buildings, Toronto, Ontario.

The results reported in the bulletin of experiments conducted at the Ontario Agricultural College in growing peas and in combatting the pea weevil, as well as the information obtained from some of the most extensive growers, merchants, millers, and exporters of peas in Ontario, lead us to make the following recommendations :

(1) That the acreage of both field and garden peas of the very best varieties be greatly increased in those sections of the Province where there are no pea weevils ;

(2) That the growing of both field and garden peas (to be ripened) in the weevil-infested districts of Ontario be discontinued for the next two years, and such crops as Early Yellow Soy beans, Grass peas, Emmer (improperly called Spelt), mixed grains, etc., be substituted ;

(3) That if any persons continue to grow and ripen peas in the infested districts, they make the best possible use of the fumigation method ;

(4) That seedsmen, farmers, and others send no infested peas into those districts of Ontario where the pea weevil does not exist ; and

(5) That farmers, gardeners, seedmen, millers, exporters, importers, and all others who have anything to do with the growing or handling of peas in Ontario, co-operate heartily in the effort to eradicate the pea weevil from Ontario within the next two years.

Hairy Vetches Grown for Seed.

For three years in succession, Hairy Vetches have been sown in the autumn and ripened in the following year, with the result that an average of 10.8 bushels of seed per acre has been obtained. The vetches sown in the autumn have been somewhat more productive of seed than those sown in the spring of the year. In past years, the Hairy Vetch seed has been principally imported from Germany, and has usually cost fully $5 per bushel. The Hairy Vetches produce a crop which seems specially useful as a pasture for farm stock, especially hogs; a cover crop in orchards ; or a green manure for plowing under to enrich the soil.

Varieties of Beans.

Thirteen varieties of beans have been under experiment in our trial grounds at the College in each of the past seven years, and the exact yield of each determined every season. In averaging the results for the seven years, we find the highest yields produced by the White Wonder, 22.8 bus.; Pearce's Improved Tree, 22.2 bus.; Medium or Navy, 21.7 bus.; Burlingame Medium, 21.6 bus.; Schofield Pea, 21.1 bus.; Day's Improved Leafless, 20.8 bus.; and Buckbee's Electric Tree, 20.5 bushels of seed per acre. The smallest average yield of beans was produced by the Large White Haricots, the yield being 13.3 bushels per acre. The Large White Haricots weighed, on an average, only 56.1 pounds per measured bushel, which was the lowest weight per bushel of all the varieties under test. Each of eight varieties gave an average weight per measured bushel of between 65 and 66 pounds, the heaviest being the Snowflake, 65.9 pounds, and the Buckbee's Electric Tree, 65.5 pounds. A variety grown in our plots in 1903 for the first time under the name of New Prize Winner gave exceptionally fine results this season, being one of the heaviest yielding varieties under test.

Varieties of Soy, Soja, or Japanese Beans.

The interest which is being taken in the Soy beans is created from the fact that some of these varieties can be grown successfully in Ontario, and that the crop is exceedingly rich in valuable constituents as a feed for farm stock. The whole plants are richer in flesh-forming constituents than Common Red Clover, and the grain is richer than any other grains which are grown in Ontario as feed for live stock. Many of the varieties of Soy beans require too long a season to give satisfactory results in Ontario. After experiments for a number of years, however, the Early Yellow variety has given good satisfaction as a grain producer, and the Medium Green variety as a fodder crop. We believe that as the Medium Green variety becomes better known, it will be grown for the purpose of cutting green and mixing with corn when filling the silo. From what we know of the Soy beans, we believe that the addition of the Medium Green variety to fodder corn when filling the silo would increase the quality of the latter greatly, would make a much better balanced ration than the corn alone, and would require less meal in order to secure satisfactory results.

Varieties of Sugar Beets.

Within the past few years, Ontario farmers have taken a good deal of interest in the cultivation of sugar beets, some of them by growing sugar beets as food for live stock, and others by growing the beets for factory purposes. Usually those varieties which give a large yield per acre, are easily harvested, and contain an average of about ten per cent. of sugar are the ones grown for feeding purposes, and those var-

ieties which grow mostly under ground and furnish about fifteen per cent. of sugar are the ones sown when sugar production is the chief aim in view. Experiments have been carried on in the experimental grounds with different varieties of sugar beets for the past ten years. Some of these varieties were specially adapted to the production of sugar, and others to the production of food for live stock. The following list gives the yield per acre in the average of ten years' experiments with each of eight varieties of sugar beets grown in the experimental grounds :

Red Top	19.8 tons	White French	18.4 tons
Lane's Improved	19.5 tons	Red Skinned	17.0 tons
White Silesian	19.5 tons	Kleinwanzlebener	16.7 tons
Champion	18.8 tons	Improved Imperial	14.9 tons

For eight years in succession, three other varieties have been grown under uniform conditions with those already mentioned, the average yield per acre for the eight years of each of these varieties being as follows : New Danish Improved, 21.8 tons ; Jersey, 19.1 tons ; French Yellow, 18.0 tons. The Green Top White, which has been grown for six years, produced an average yield of 21.3 tons, and the Vilmorin's Improved, which has been grown for five years, produced an average yield of 10.6 tons per acre.

Within the last four years, a greater number of varieties of sugar beets have been grown in the experimental grounds than in any previous year. In 1900 and in 1901, the sugar beet seed was planted in rows 26 inches apart, and the plants were thinned to a distance of 7.9 inches apart in the rows. In 1902 and in 1903, however, all the varieties were planted in rows 21 inches apart and a distance of 7 inches was left between the plants in the rows. The following table gives the average yield per acre of duplicate experiments conducted with nineteen varieties in 1900, twenty-one varieties in 1901, thirty varieties in 1902, and thirty-two varieties in 1903 :

Varieties.	Yield of roots per acre.				
	1900. Tons.	1901. Tons.	1902. Tons.	1903. Tons.	Average. Tons.
1 New Danish Improved	19.10	18.60	27.88	27.44	23 21
2 Red Top	24.25	19.63	26 81	20.83	22 88
3 Royal Giant	14 95	19.29	29.63	26.55	22.61
4 Giant Rose Feeding Sugar	14.50	17.67	25.38	31.11	22.17
5 Giant White Feeding Sugar	14.05	17 22	25.38	31.53	22 05
6 Red Skinned	21.55	20.60	22.38	22.36	21.72
7 White French	17.35	14 39	29 06	26 08	21 72
8 White Silesian	21.45	18.15	25 94	21 23	21.69
9 Carter's Nursery	13 35	14.93	29.38	27.02	21.17
10 Green Top White	18.35	18 91	26.56	20.47	21.07
11 Lane's Improved	20 45	16.28	22 75	22.08	20 39
12 Champion	19.25	17.18	22 38	21.00	19 95
13 Queen of the Danes	11 65	12.63	26 00	29.27	19 89
14 Kleinwanzlebener	14.38	16 81	23.06	20.97	18 81
15 Jersey	13.70	14.63	20.69	23.06	18 02
16 Imperial Grey Top	11.85	15.87	21 81	22.39	17 98
17 French Yellow	13.15	15.14	23 19	19.48	17.74
18 Pitzscheke's Elite	14.85	14.61	20.63	20 70	17 70
19 Improved Imperial	14.00	14 22	21 31	19.83	17.34
20 Mangel Sugar Beet		13.01	20.50	21.27	18.26
21 Vilmorin's French Sugar		13.22	19 44	21.45	18.04
22 Ideal			30.18	31.69	30.91
23 Rennie's Giant Sugar			33 00	26.50	29 75
24 Tankard Cream			28 56	28.75	28 66
25 Kleinwanzlebener (Mette)			21.50	22.44	21.97
26 Jaensch's Victrix			21.44	21.23	21.34
27 Rubensamen (Rimpau)			21.06	19 67	20.37
28 Dieckman No. 3			20 44	19.86	20 15
29 Dieckman No. 1			19.63	19.33	19.48
30 Dieckman No. 2			19.13	18.52	18 83
31 Hybrid Sugar Beet Mangel				25 23	25.23
32 Imperial Giant Half Sugar				25.02	25.02

It will be observed from the accompanying table that the variety of sugar beets known as the Ideal, which has been grown in the experimental grounds for only two years, produced the second highest yield of roots per acre among thirty varieties in 1902, and the highest yield among thirty-two varieties in 1903. It will be seen that the Kleinwanzlebener, which is the variety principally used for the production of beets for the four factories now manufacturing sugar in Ontario, yielded 14.4 tons in 1900, 16.8 tons in 1901, 23.1 tons in 1902, and 21 tons per acre in 1903,—making an average of nearly 19 tons per acre for the four years. Varieties, such as the New Danish Improved, Red Top, and Royal Giant, which produce heavy crops per acre, contain a much less percentage of sugar than the Kleinwanzlebener variety, and are thus not nearly as suitable for factory purposes. A number of the varieties near the end of the list, which have been grown for only two years, were imported from Germany. They were obtained from different sugar beet breeders in Germany who have made a specialty of selecting beets for years in order to obtain a high percentage of sugar. For the results of the chemical analyses of these beets, the reader is referred to the report of the Chemical Department, written by Prof. Harcourt, in a previous portion of this volume.

Planting Sugar Beets at Different Distances Between Drills.

An interesting experiment was conducted in our trial grounds in 1902 and again in 1903 by planting sugar beets in rows nine different distances apart. The experiment was conducted in duplicate each year. There were seven rows in each plot, each row being four rods in length The variety of sugar beets known as the Kleinwanzlebener was used throughout. The average results of the experiments are here presented in tabulated form:

No.	Distances.	Average of four tests.		
		Average Weight per root 1902-3.	Yield of tops per acre. 1902-3.	Yield of roots per acre. 1902-3.
		Lbs.	Tons.	Tons.
1	12 inches apart	.65	13.30	23.41
2	14 " "	.74	9.43	22 92
3	16 " "	.81	10.49	22.51
4	18 " "	.87	9.65	21.31
5	20 " "	.99	10.04	21.72
6	22 " "	1.05	10.51	21.41
7	24 " "	1.11	9.50	20.59
8	26 " "	1.18	9.43	20.50
9	28 " "	1.21	9.40	19:19

In the average results of the two tests made in each year, it was found that, as the distance between the rows increased, there was a gradual increase in the average size of the roots, and, with two or three slight exceptions a decrease in the yield of roots per acre. The roots which were grown in rows 18 and 20 inches apart, which are the usual distances to grow sugar beets for the production of sugar, produced an average yield of about two tons per acre more than the average yield produced from rows 28 inches apart, which is about the distance usually left between the rows when growing sugar beets for feeding purposes. Samples from the various parts of this experiment were taken to the chemical laboratory, and were analysed by Prof. Harcourt in order to ascertain the percentage of sugar from beets grown in rows at different distances apart. For the results of these analyses, the reader is referred to the report of the Chemical Department, to be found earlier in this volume.

Thinning Sugar Beets at Different Distances in the Drills.

An experiment was conducted in 1903 for the first time by planting sugar beets in rows 18 inches apart, and thinning the plants in the rows to the distances of two, four, six, eight, and ten inches apart. Each plot consisted of six rows, fifty links (two rods) in length. The Kleinwanzlebener variety of sugar beets was used in the experiment, which was conducted in duplicate. The average of the two tests made in 1903 shows the average yield per acre from the different distances of thinning the plants to be as follows : 2 inches apart, 21 tons; 4 inches apart, 18.3 tons; 6 inches apart, 17 tons ; 8 inches apart, 15.9 tons ; and 10 inches apart, 15.7 tons. However, we find that from the plants thinned at different distances, we obtained the following average weight per root : 2 inches apart, 9.6 ozs.; 4 inches apart, 14.7 ozs.; 6 inches apart, 1 lb.; 8 inches apart, 1 lb. 2 ozs.; and 10 inches apart, 1 lb. 11 ozs. These results show that as the distance between the roots increased, there was a gradual increase in the average size of the roots and a gradual decrease in the average yield of roots per acre. The results of experiments presented under the last two headings show that the Kleinwanzlebener variety of sugar beets produced a larger yield per acre when the plants were comparatively close together than when they were thinned to a greater distance apart.

Flat and Ridged Cultivation for Sugar Beets.

In 1902, and again in 1903, an experiment was conducted in growing sugar beets on the flat as compared with ridged cultivation. The Kleinwanzlebener variety was used throughout. Each plot consisted of six rows, each row being fifty links (two rods) in length. Twenty-one inches were allowed between the rows, and seven inches between the plants in the row. The experiment was conducted in duplicate each year. The average yield of sugar beets per acre from the flat cultivation was 20.6 tons in 1902, and 21 tons in 1903, while that from the ridged cultivation was 19.8 tons in 1902, and 19.7 tons in 1903. It will, therefore, be seen that in the average of two years' experiments the land which was cultivated on the flat produced a little more than one ton of sugar beets per acre more than the land which was ridged up at the time when the sugar beet seed was sown.

Selection of Sugar Beet Seed.

Each sugar beet seed, as it is usually sown, contains one, two, three, or more germs, and is, therefore, capable of producing from one to at least four plants. The seed, as it is sown, therefore, is usually a cluster of seeds. The selection of seed in the case of sugar beets is, therefore, necessarily somewhat different from that of carrots or turnips. In order to ascertain the comparative value of different sized sugar beet seed clusters as they are usually sown, an experiment has been conducted by sowing large, medium, and small seed clusters in each of five years. The experiment has been conducted in two sections. In one section, only one seed cluster of each selection was planted in one place, and in the other section, three large seed clusters, five medium-sized seed clusters, and eight small seed clusters were planted in each place. Each section of the experiment was conducted in duplicate. The first section allowed a better determination of the comparative germination of the seed clusters, and the second section afforded a better opportunity for thinning the plants and getting a more uniform stand of roots. It has been found that a better stand of roots, however, can be obtained from three large seed clusters than from five medium-sized seed clusters; and also a better stand of roots from five medium-sized seed clusters than from eight small seed clusters. Averaging the results of the four tests made in the each of the five years, we obtain the following yields of sugar beets per acre : Large seed clusters, 22.9 tons; medium-sized seed clusters, 21.9 tons; small sized seed clusters, 14.3 tons.

Soaking Sugar Beet Seed Before Planting.

An experiment was conducted in 1903 for the first time by planting unsoaked seed and seed which had been soaked twelve, twenty-four, and thirty-six hours before it was planted. The experiment was conducted in duplicate. In each test, the unsoaked seed gave slightly the lowest yield per acre. The average results of the two tests in 1903 show that the highest yield, 15.8 tons, was obtained from the seed soaked for twelve hours, and the lowest yield, 13.9 tons, was obtained from the seed which had not been soaked.

Varieties of Potatoes.

The potatoes grown in Ontario for the past twenty years have had an annual average market value of fully seven millions of dollars. According to the Report of the Bureau of Industries, the largest average yield of potatoes per annum obtained within the last ten years was 159 bushels per acre, and the lowest average yield of potatoes per annum was 84 bushels per acre. The highest yield was obtained in 1895, and the lowest in 1898. The average yield per acre of potatoes grown in Ontario in the last twenty-one years has been 115 bushels.

Eighty-eight varieties of potatoes were grown in the experimental grounds in 1903. The potatoes were planted on the 30th of May in rows 26 2-5 inches apart, and the cut pieces were placed one foot apart in the rows. The potatoes were planted about four inche deep, and the land received level cultivation throughout the season. A combination of Bordeaux mixture and Paris Green was applied on three different occasions.

The varieties which gave the largest yield of sound potatoes per acre in the experiments conducted in 1903 were as follows : Empire State, 336.7 bus.; Pearl of Savoy, 325.4 bus.; Seedling No. 230, 322.1 bus.; Up-to-date, 315 bus.; Salzer's Earliest, 312.9 bus.; American Wonder, 312.1 bus.; White Elephant, 309.1 bus.; Dempsey's Seedling, 306.3 bus.; New Main Crop, 288.8 bus.; and Howe's Premium, 281.7 bushels. Those giving the smallest yield per acre were the Carter's Royalty, 95 bushels, and Skerries, 102.9 bushels.

As potatoes rotted quite badly throughout many sections of Ontario during the past year, and as those grown at the College did not escape the disease, we have some interesting results in regard to the susceptibility of the different varieties to the ravages of this disease. A very careful count was made of all sound potatoes, and all rotten potatoes at the time of digging the different varieties. Another careful examination was made after the potatoes had been harvested about three weeks, and the rotten ones were separated from the others and counted. This enabled us to ascertain the exact percentage of rotten potatoes of each variety in 1903. The results show that the smallest amount of rot was obtained from the following varieties : Robertson's Champion, ½ per cent.; Green Bay, 2 per cent.; Holborn Abundance, 2 1-5 per cent.; Stray Beauty, 2½ per cent.; Bliss Triumph, 2½ per cent.; Salzer's Earliest, 3 per cent.; Up-to-date, 3 per cent.; Early Pinkeye, 3 per cent.; Seedling No. 230, 4 per cent.; and Skerries, 6 per cent. The varieties which contained the greatest amount of rot in 1903 were the Beauty of Hebron, 58 per cent.; White Pinkeye, 56 per cent.; New Queen, 55 per cent.; Weld's Orange, 53 per cent.; Burnaby Mammoth, 52 per cent.; Brown's Prolific, 50 per cent.; Leamington, 50 per cent.; Hanlan Beauty, 50 per cent.; Montana Bluff, 49 per cent.; and Rose's New Invincible, 48 per cent.

In the average results of the different varieties of potatoes grown for ten years in succession, the Empire State, Pearl of Savoy, Rose's New Invincible, Rural New Yorker No. 2, American Wonder, and White Elephant have been among the very heaviest yielders.

In each of two years, about two hundred varieties were carefully tested for table quality. The Empire State was found to be one of the best varieties for table use as well as for producing an abundant crop.

Six rows of each of twelve very early varieties were planted in the spring of 1903. Two rows of each variety were dug and weighed at the end of nine weeks, two other rows at the end of twelve weeks, and the two remaining rows at the end of fifteen weeks after planting. There was but very little rot in these very early potatoes this year. In this experiment, which was conducted in duplicate, the following varieties produced the largest average yields of potatoes per acre at nine weeks after planting: Acme, 233 bus.; Early Dominion, 215 bus.; Early Andes, 214 bus.; and Early Ohio, 210 bushels.

In the average results of eight years' experiments in digging early potatoes nine weeks after planting, the following yields per acre have been obtained: Stray Beauty, 107 bus.; Early Ohio, 105 bus.; Early Dominion, 101 bus.; Howe's Premium, 99 bus.; and Burpee's Extra Early, 79 bushels.

Different Methods of Treatment for the Potato Beetle.

For eight years in succession, an experiment has been conducted at the College by using different methods of treatment for destroying the potato beetles (bugs). In each of these years, the treatments which were made were as follows: Paris Green and water, Paris Green and plaster, and Potato Bug Finish. All the treatments were made from two to four times in each season, according to requirements. One plot in every test was allowed to remain untreated. The average results of the eight years' experiments give the following yields per acre:

Nothing ..... 81.0 bushels.
Potato Bug Finish ..... 124.5 bushels.
Paris Green and Plaster ..... 130.9 bushels.
Paris Green and Water ..... 138.2 bushels.

In six out of the eight years, the Paris Green and water gave the highest yield per acre, and in each of the eight years the untreated potatoes gave decidedly the lowest yield per acre.

In 1902, and again in 1903, six lots, of each of two varieties of potatoes, were carefully selected and planted on twelve separate plots. After the potatoes had made sufficient growth and the potato beetles (bugs) had made their appearance, five plots of each variety were treated in different ways to destroy the beetles, and one plot of each variety was left untreated as a basis of comparison. The five treatments made in each of the years were as follows: (1) Paris Green and water, using one pound of Paris Green in 96 gallons of water per acre; (2) Paris Green with plaster, using one pound of Paris Green and 38 pounds of plaster per acre, and applying the mixture to the potatoes in the dry condition; (3) Potato Bug Finish, which was applied dry at the rate of 20 pounds per acre; (4) Bug Death and water, using 32 pounds of Bug Death mixed in 96 gallons of water per acre; and (5) Bug Death, used in the same proportion as in No. 4, but in the dry condition. Three applications of each of the five treatments were made in both years. In the autumn, the potatoes from each of the twelve plots were dug and weighed. The following are the average results in yield of potatoes per acre:

Treatments.	Yield of sound potatoes per acre.		
	Average two varieties. 1902.	Average two varieties 1903.	Average two years 1902 and 1903.
	Bushels.	Bushels.	Bushels.
Nothing	68 0	124.6	96.3
Paris Green and Water	123.5	172.7	148.1
Paris Green and Plaster	136.7	160 6	148.7
Potato Bug Finish	107.0	166.7	136 8
Bug Death and Water	163 4	192.9	178.2
Bug Death Dry	168.9	219.4	194.2

The Bug Death is manufactured at St. Stephen, N.B., and has recently been introduced into Ontario. It was tested in our trial plots at the Agricultural College in 1902 for the first time. It has certainly made an excellent record in each of the past two years The potato tops on which the Bug Death was applied were more vigorous in growth and greener in appearance throughout each of the seasons than those on which the other applications were made. The usual prices of these insecticides when bought in quantity are about as follows : Paris Green, 20 cents per pound ; Bug Death, 8 cents per pound; and Potato Bug Finish, 1 2-3 cents per pound. The cost, therefore, for the material used in the experiment conducted in 1902 and again in 1903 was about as follows : Paris Green and water, 60 cents per acre; Paris Green and plaster, 88½ cents per acre; Bug Death, $7.68 per acre ; and Potato Bug Finish, $1.00 per acre.

Bordeaux Mixture for the Potato Blight

It is very seldom that the potatoes grown in the experimental plots have been injured with rot. In some places, the rot has proven very troublesome, and excellent results have been obtained by the use of the Bordeaux mixture along with the Paris Green, the first spraying being done when the plants were about six inches in height, and the second and third sprayings at intervals of ten to fifteen days. In some cases, five or six sprayings of Bordeaux mixture have been made in the same season.

In 1903 an experiment was conducted in our experimental plots by spraying two varieties of potatoes with Paris Green and Bordeaux mixture, and also the same two varieties of potatoes with Paris Green alone. The potatoes for this experiment were planted on June 10th, and the sprayings took place on July 11th, July 23rd, and August 6th. The Bordeaux mixture was made in the same way and in the same proportions as described in the College Bulletin, No. 122, copies of which can be obtained from the Department of Agriculture, Toronto, Ontario. The results of the experiment show that an average yield of 188 bushels of sound potatoes was obtained from the treatment of a combination of Paris Green and Bordeaux mixture, and 173 bushels of potatoes per acre from the Paris Green solution alone. There was considerably less rot in those potatoes on which the Bordeaux mixture was used. Bug Death appeared to exert almost exactly the same influence as Bordeaux mixture in preventing the rot in 1903.

Varieties of Mangels.

Thirty-three varieties of mangels were grown in the experimental grounds under similar conditions in 1903. Each variety consisted of three rows, each row being four rods in length. The rows in all cases were 26 2-5 inches apart. The plants were thinned to a distance of ten inches apart in the rows.

The greatest yields per acre in 1903 were obtained from the Yellow Leviathan, 43.1 tons, and the Sutton's Mammoth Long Red, 42.4 tons. All other varieties gave less than 40 tons of roots per acre.

Fifteen varieties of mangels have been grown for six years in succession. The five varieties which have produced the greatest average yield of roots per acre for six years are as follows : Yellow Leviathan, 33.5 tons; Sutton's Mammoth Long Red, 33.2 tons; Oblong Giant Yellow, 32.6 tons ; Mammoth Golden Giant, 32.2 tons; and Steele-Briggs Giant Yellow Intermediate, 31.8 tons. The Yellow Leviathan variety generally produces roots which are smooth on the surface, yellow in color, compact in form, and intermediate in length. The Yellow Leviathan was distributed throughout Ontario in connection with the co-operative experiments in 1903 for the first time. According to the reports of the experimenters, it was the most popular of the three varieties distributed. The seed of this variety was obtained from D. M. Ferry, seedsman, Windsor, Ontario.

Soaking Mangel Seed Before Planting.

An experiment has been conducted for two years in succession by planting mangel seed which had been soaked for twelve, twenty-four, and thirty-six hours, and also mangel seed which was unsoaked. As the result of the two years' experiments, the mangel seed which was soaked for twelve hours gave the largest yield of roots per acre. This experiment will likely be repeated for several years.

Planting Mangel Seed at Different Depths.

For five years in succession, mangel seed has been planted in the experimental grounds at five different depths. The experiment was conducted in duplicate each year. The following are the average results of the ten tests made in the five years, and represent the yield of roots per acre from each depth of planting: ½ inch, 23.6 tons; 1 inch, 19.8 tons; 1½ inches, 19.3 tons; 2 inches, 17.9 tons; 3 inches, 13.8 tons; and 4 inches, 6.3 tons.

Breaking of Mangel and Sugar Beet Seeds or Clusters.

The mangel and sugar beet seed as purchased is usually quite uneven in size and difficult to sow evenly over the ground. Each seed usually contains from one to four, and sometimes even as high as seven germs, which produce one, two, three, or more plants. It will, therefore, be seen that what is usually called a seed is actually a number of fruits united together in a cluster. Experiments have been conducted at the College in each of the past two years to ascertain whether these seed clusters could be broken in such a way that the seed could be sown more evenly over the soil and the thinning of the roots be accomplished with less difficulty. The seeds, however, adhere so closely to the surrounding matter that it is very difficult to break the clusters without injuring the seeds. Our work so far in trying to shell seed has not proven satisfactory, as we have obtained considerably better results from the seed clusters which were left unbroken than from those which were broken, or crushed.

Preparation of Land for Mangels.

In the spring of 1901, a strip of land two rods in width and forty rods in length was divided into thirty-two plots. Paths five links (39.6 inches) in width were allowed between the plots. The land is very level throughout, and had been uniformly cropped previous to the date here mentioned. In the spring of 1901, the whole range was sown to early oats. No. 1 plot was seeded with Common Red Clover, No. 2 plot with Alsike Clover, No. 3 plot with Timothy, and No. 4 plot received no clover or grass seed. Similar seedings to these were repeated until the whole range was seeded according to the plan outlined above. It will, therefore, be seen that there were eight plots of Common Red Clover, eight plots of Alsike Clover, eight plots of Timothy, and eight plots left without seeding. After the oats were cut, the plots were carefully edged. Both the clover and the timothy made good growth in the autumn. In the following spring, the growth of the three crops on each of the twenty-four plots was excellent. The range was divided into two sections, and each section into four divisions, each division containing one plot of Common Red Clover, one plot of Alsike Clover, one plot of timothy, and one plot without any crop. The land in No. 1 division was plowed after the first crop of the season had received its full growth and before it had been removed from the land; No. 2 division was plowed immediately after the first crop of the season had been removed; No. 3 division was plowed before the second crop had been removed; and No. 4 division was plowed immediately after the second crop had been removed from the land. The remaining eight plots were an exact duplicate of the first section. The land was cultivated on the surface in the autumn and was sown with

mangels in the spring of 1903. The Sutton's Mammoth Long Red variety was used in the first section, and the Yellow Leviathan variety in the second section. The average results of the two sections show that the clover sod gave decidedly better results than the timothy sod. The greatest average yield of roots per acre (35.5 tons) in 1903 was produced on land in which the first crop of Alsike Clover had been plowed in. This land produced 5¼ tons per acre more than that on which the first crop of timothy was plowed in. Taking the average of all the experiments in 1903, we find that the Common Red Clover land produced 2.1 tons, and the Alsike Clover land, 3.6 tons per acre more than the timothy land. It is intended to sow these plots with another crop in 1904, and with still another crop in 1905, in order to study the manurial effects of the different crops plowed under for a series of years. This whole experiment will likely be repeated several times.

Varieties of Swede Turnips.

A large number of varieties of Swede turnips have been carefully tested in the experimental grounds in past years. As the result of these experiments, it is found that there is a very great difference in the productiveness and the quality of the different varieties. In the average of five years' experiments, five of the largest yielding varieties have made the following yields per acre: Sutton's Magnum Bonum, 21.5 tons; Buckbee's Giant, 20.1 tons; Hartley's Bronze Top, 19.4 tons; Kangaroo, 18.7 tons; and Hall's Westbury, 18.7 tons.

Varieties of Fall Turnips.

As in the case of Swede turnips, a large number of varieties of the fall, or soft, turnips have been grown in the experimental plots for several years in succession. The following represents some of the best varieties in the experiments covering a period of five years: Red Top White Globe, 27.5 tons; Early American Purple Top, 21.1 tons; Cow Horn, 18.7 tons; Green Barrel, 18.4 tons; and Jersey Navet, 18.2 tons per acre. It will, therefore, be seen from the average results for five years, that the Red Top White Globe has given decidedly the largest yield of roots per acre. The roots of this variety are usually firm, and are not generally troubled much with rot, which affects some varieties very seriously in the autumn of the year.

Varieties of Carrots.

Twenty-four varieties of carrots were sown on the 9th of May in 1903. Of these varieties, three gave upwards of 40 tons of roots per acre, viz., Mammoth Intermediate Smooth White, 42.9 tons; Steele's Improved Short White, 41.3 tons; and Mastadon White Intermediate, 40.3 tons. In the average results of sixteen varieties grown under uniform conditions in each of six years, we find the greatest yields produced by the following sorts: Mammoth Intermediate Smooth White, 31.3 tons; Mastadon White Intermediate, 31.1 tons; Steele's Improved Short White, 30 tons; Inversion's Champion White Intermediate, 29.1 tons; and Simmers' Short White Vosges, 28.3 tons per acre. In comparison with these, we find that the Half Long Stump Rooted yielded only 20.7 tons, and the Danver's Orange only 21.3 tons per acre.

Depth of Planting Carrot Seed.

In each of four years, an experiment has been conducted in duplicate by planting carrot seed at six different depths in the soil. The land was cultivated on the level throughout. The average of the ten tests made in the five years shows that the following yields per acre have been obtained from seeds planted at the depths here indicated: ½ inch, 13.4 tons; 1 inch, 13.4 tons; 1½ inches, 8.7 tons; 2 inches, 4.4 tons; 3 inches, 1.2 tons; and 4 inches, 1.3 tons.

Varieties of Parsnips.

Numerous enquiries have been received regarding the advisability of growing parsnips with the object of using the roots as a food for farm stock. As little information could be obtained in reference to the growth of parsnips as a field crop, some experiments have been conducted with different varieties of parsnips in order to obtain some information along this line. Six varieties were grown in 1903. The highest yield per acre was obtained from the Buckbee's New Sugar Parsnip (14.8 tons), and the lowest yield per acre from the Garton's Common Field Cattle Parsnip (7.1 tons). The first of these has been grown for four years, and the last for only two years. Three varieties have been grown in each of six years, and the results show the following yields of roots per acre : Improved Half Long, 11.8 tons; New Ideal Hollow Crown, 11.7 tons; and Improved Long Smooth, 11.1 tons per acre.

Varieties of Corn for the Production of Fodder or Silage.

One hundred and thirty-five varieties of corn were grown in the experimental grounds in 1903. Owing to the peculiar weather conditions in each of the past two years, only about twenty of these varieties reached maturity in time for cutting in the autumn. The greatest total yields in 1903 were produced by the following kinds : New Century Wonder, 29.3 tons; Cloud's Early Yellow, 26.9 tons; Eureka, 26.9 tons; Pennsylvania Early Dent, 26.4 tons; Mastadon Dent, 26.3 tons; and 100 Day Bristol, 26.2 tons. Although the New Century Wonder produced decidedly the greatest yield of total crop per acre, it was exceedingly late and very deficient in ears, the yield of ears being only about two-fifths of a ton per acre, while that of Cloud's Early Yellow was 3.7 tons; Eureka, 3.4 tons; 100 Day Bristol, 3.2 tons; Mastadon Dent, 3.2 tons; and Pennsylvania Early Dent, 2.2 tons per acre.

A large number of varieties of corn have been grown for several years in succession, the results of which form a better basis for the selection of leading varieties than those obtained from the experiments of the past year. Of all the varieties which have been grown for several years in succession, we find that the Mammoth Cuban and the Mastadon Dent are varieties which give excellent satisfaction on the warm soils of Southern Ontario, where large varieties of corn can be grown successfully ; that the Wisconsin Earliest White Dent gives a good yield of total crop per acre, which is of excellent quality, this variety producing the largest yield of ears per acre among sixty-seven varieties grown for five years in succession, and being well suited to the central part of Ontario where the frosts are not too severe; and that the three flint varieties,—Salzer's North Dakota, Compton's Early, and King Phillip,—and one dent variety, North Star Yellow Dent, have given good results and are well suited for the central and northern part of Ontario.

Corn Planted at Different Depths.

For five years in succession, an experiment has been conducted by planting corn ½ inch, 1 inch, 1½ inches, 2 inches, 3 inches, and 4 inches below the surface. The experiment was conducted in duplicate each year, and the land was cultivated on the level throughout. As the average results of the ten different tests made in the five years, we have obtained the following yields per acre : ½ inch: 11 tons total crop, 2.4 tons ears; 1 inch: 14.3 tons total crop, 2.5 tons ears; 1½ inches: 13.4 tons total crop, 2.3 tons ears; 2 inches: 15.1 tons total crop, 2.6 tons ears; 3 inches: 13.8 tons total crop, 2.4 tons ears; and 4 inches: 12.6 tons total crop, 1.9 tons ears. From these results, it will be seen that the greatest yield of both total crop and ears per acre was obtained from planting at a depth of 2 inches upon soil which might be termed an average clay loam. The planting usually took place in the last week of May.

Methods of Cultivating Corn.

In 1902, and again in 1903, an experiment was conducted by cultivating corn in four different ways. The North Star Yellow Dent variety of corn was used in the experiment, and the experiment was conducted in duplicate each year. Each test consisted of four plots. The average results of the two tests made in each of two years are as follows: (1) Deep cultivation at first, gradually getting shallower as the season advanced, 23 tons per acre; (2) Shallow cultivation throughout the season, 22.7 tons per acre, (3) Deep cultivation throughout the season, 21.6 tons per acre; and (4) Shallow cultivation at first, gradually getting deeper as the season advanced, 21.6 tons per acre. From these results, it will be seen that in seasons such as we have had in the past two years, corn which was cultivated deeply immediately after it was planted, and in which the cultivation was shallower as the season advanced, produced the greatest yield, while that which was cultivated shallow at first and deeper as the season passed by, produced a lighter yield by 1 2-5 tons per acre.

Varieties of Sorghum for Fodder.

Fifteen varieties of sorghum have been tested in the experimental grounds in each of the years 1899, 1900, 1901, 1902, and 1903. These include different varieties of Sugar Cane, Broom Corn, Kaffir Corn, Millo Maize, etc. Some of the varieties of sorghum have been extensively advertised as very valuable crops to be grown for stock feeding. A few of these, such as the Early Amber Sugar Cane, have given very good results in some sections of the Province. The average results of the five years' experiments with each of fifteen varieties are here presented:

Varieties.	Average height 5 years.	Yield per acre. Average 5 years.	
		Heads.	Total crop.
	Inches.	Tons.	Tons.
1 Early Minnesota Sugar Cane	94	.55	16 84
2 Orange Sugar Cane	79	.13	15.64
3 Fodder Cane	84	.57	15.51
4 Early Amber Sugar Cane	90	.38	14 82
5 Kansas Orange Sugar Cane	75	.11	14 23
6 Kaffir Corn	56	.27	11.22
7 Black Rice Corn	58	.27	11 05
8 California Golden Broom Corn	93	1.04	10.44
9 Improved Evergreen Broom Corn	99	.96	9.14
10 Brown Dhoura Corn	60	.56	7 60
11 Early Japanese Broom Corn	92	.90	7 55
12 Yellow Millo Maize	62	.32	7.40
13 Jerusalem Corn	57	.40	6.49
14 White Millo Maize	58	.02	6.18
15 Dwarf Broom Corn	74	.79	7.41

From the accompanying table of results, it will be seen that the Sugar Canes come at the top of the list in total yield of green crop per acre. The Early Minnesota variety produced an average of 16.8 tons, which is about two tons per acre more than that produced by the Early Amber, which is perhaps the best known of the different varieties of Sugar Cane which have been grown in Ontario. The Jerusalem Corn and two varieties of Millo Maize, regarding which extravagant claims have been made, have produced the lightest average yields per acre.

Varieties of Sunflowers.

We have grown in all about a dozen varieties of sunflowers in the experimental department, and have found that nearly all of them have grown satisfactorily. Three varieties have now been grown under similar conditions for eight years in succession

with the following average yields per acre : Black Giant, 18.3 tons of total crop and 5.5 tons of heads; Mammoth Russian, 15.2 tons of total crop and 5.1 tons of heads; and White Beauty, 15 tons of total crop and 5.5 tons of heads. The Black Giant grew to an average height of 94.5 inches, the Mammoth Russian, 90.2 inches; and the White Beauty, 81.4 inches.

Varieties of Millet for Green Fodder and for Hay.

Upwards of thirty varieties of millet have been grown in the experimental grounds at the College for the purpose of gaining information regarding the most suitable kinds for cultivation in this Province. The varieties which have produced the greatest yield per acre in the results of experiments covering a series of years are as follows: Golden Wonder, Holy Terror Gold Mine, Magic, Japanese Panicle, Japanese Barnyard, German or Golden, and Siberian. The Japanese Panicle millet has an upright tall growth, a spreading head, a large amount of leaf, and an abundance of seed. The seeds are comparatively large, nearly black, and very shiny. This variety will likely be grown more extensively, as its good qualities become better known. It usually yields considerably more than the Common Hungarian Grass.

Varieties of Rape, Kale, Cabbage, etc.

Rape is fairly well known in many parts of the Province as a very satisfactory crop to grow, especially for sheep and hogs. The different kinds of cabbage and kale, however, which are used somewhat extensively in Great Britain as a food for farm stock, are not known, except to a very slight extent in Ontario. Experiments have been conducted in each of the past five years with fifteen varieties of rape, kale, cabbage, etc., in order to glean some information regarding the comparative yields of these varieties when grown under uniform conditions in Ontario. The seed has been sown in rows about 26 inches apart, and the land has been cultivated in much the same way as that containing a crop of turnips. Only about one pound of seed per acre is required when sown in rows and the land cultivated. The seeding usually takes place in June, and the crop is harvested in the latter part of September, or in October. The following gives the average results of each variety for five years :

Sutton's Earliest Drumhead Cabbage.... ....18.9 tons per acre.
Dwarf Essex Rape..... ... ...17.9 tons per acre.
Dwarf Victoria Rape..... ... ...17.9 tons per acre.
Thousand Headed Kale.... ... ...16.7 tons per acre.
Purple Sprouting Boroccoli..... ... ...16.2 tons per acre.
Marrow Stem Kale. ....16.0 tons per acre.
Hardy Curled Kale ....15.6 tons per acre.
Jersey Kale..... .... 14.7 tons per acre.
Sutton's Earliest Sheepfold Cabbage.... ... .14.5 tons per acre.
Marrow Collards..... ....14.4 tons per acre.
Sutton's Best of All Savoy Cabbage ... .14.3 tons per acre.
Tall Green Curled Scotch Kale ....12.0 tons per acre.
Sutton's Latest Drumhead Cabbage. ....11.1 tons per acre.
Brussels Sprouts..... ....10.9 tons per acre.
Tall Jersey Cabbage..... ... ... 8.8 tons per acre.

The Buckbee's Wonderful Dwarf Bonanza rape, which has been grown in our experimental plots for only two years, has slightly surpassed the Dwarf Essex variety of rape in experiments of each of the years 1902 and 1903. Through the kindness of Mr. Dicks, of the Cooper-Taber Seed Company, England, we received five other varieties

of rape which we had under experiment in 1903, two varieties of which gave very satisfactory results, namely, the Large Seeded Common Rape and the Large Seeded Umbrella Rape.

Green Fodder Crops.

For three years in succession, fifteen varieties of fodder crops have been grown in competition in the experimental grounds. Some of these varieties have been grown for a very much longer period, but for the sake of comparison the results which are here presented are the averages of the three years 1901, 1902, and 1903 :

Varieties.	Average for three years.	
	Length of plants.	Tons of green crop per acre.
1 Hairy Vetches	33	11.95
2 Medium Green Soy Beans	32	11.50
3 Common Vetches	....	9.80
4 Early Yellow Soy Beans	26	8.65
5 Grass Peas	40	7.18
6 Horse Beans	30	7.13
7 American Coffee Berry	24	6.55
8 Wonderful Cow Peas	17	5.69
9 Extra Early Blackeye Cow Peas	16	5.65
10 Taylor Cow Peas	13	5.27
11 New Era Cow Peas	14	4.87
12 Whip-poor-will Cow Peas	14	4.65
13 Warren's Extra Early Cow Peas	13	3.70
14 Velvet Beans	14	2.30
15 Extra Early Dwarf Soy Beans	19	2.16

In the average results for the past seven years, the Hairy Vetches produced a yield of about 4½ tons of green crop per acre more than that produced by the Common Vetches. The Medium Green Soy Beans, which come second in the accompanying list in yield per acre, are an exceptionally fine variety, and we believe will be grown more and more for the production of fodder either for feeding in the autumn or for mixing with corn when filling the silo, in order to increase the quality of the silage. If the Medium Green Soy beans are sown in rows about 30 inches apart with the beans about 8 inches apart in the row, about the time that the corn is planted, the crop would generally be ready for mixing with the corn and putting in the silo when the corn is in the best condition. The Early Yellow Soy beans are more specially adapted to the production of grain than of green fodder, as they are earlier in maturing than the Medium Green variety and produce a grain which is exceedingly rich, being richer than any of the crops usually grown on Ontario farms. The Grass peas have given very good results as a green crop in each of the past two years, but, owing to the exceptionally cool, damp weather in 1902 and again in 1903, the Grass peas have not ripened as satisfactorily as usual. Most of the varieties of Cow Peas come towards the end of the list in comparative yields of green fodder, and are generally unsuitable for Ontario conditions.

Annual Crops for Fodder Purposes.

An experiment was started in the spring of 1900 to find out which annual crops were likely to give the best results when used for pasture. For this purpose, eighteen crops were selected. In each of the years the crops were sown in three separate sets, there being eighteen plots in each set,—thus making in all a total of fifty-four plots each season. All of the plots were sown on the same day and under similar conditions

each year. The main object of the experiment was to find out the relative value of the different crops for pasture, both early in the season and throughout the summer. The seed was all sown early in May in each year. The three sets were handled in each season as follows:

Set 1. The crops on all the plots in Set 1 were cut at the end of six, nine, twelve, fifteen, and eighteen weeks after the seed was sown, thus making five cuttings for each crop. Each cutting was weighed in the green state, and also after it was dried in the form of hay.

Set. 2. Each crop was cut when it was thought to contain the largest bulk of the best quality of green fodder. In order to ascertain the aftergrowth, another cutting was also made from each plot later in the season.

Set 3. A hurdle fence was placed around the set of eighteen plots and cattle were turned on the plots daily until the pasture was all eaten. The first pasturing took place the latter part of June and the early part of July. Careful notes were taken of the amount eaten from each crop each day. After the crops were pastured the first time, they were allowed to remain undisturbed until the autumn, when the cattle were again turned on and the second growth was eaten off.

The results of experiments conducted for three years in succession show that the greatest amount of pasture was produced by the following crops: (1) Hairy Vetches, (2) Crimson Clover, (3) Siberian Oats, (4) Early Amber Sugar Cane, (5) Common Red Clover, (6) Common Vetches, (7) Spring Rye, (8) Dwarf Essex Rape, (9) Hungarian Grass, and (10) Mandscheuri Barley.

The results of these experiments up to the present time seem to show the advantage of growing a mixture of annual crops rather than growing the crops separately for pasture. The results indicate that the following combinations should prove serviceable for the production of pasture of good quality throughout the season: (1) Oats, Hairy Vetches, and Early Amber Sugar Cane; (2) Spring Rye, Hairy Vetches, and Hungarian Grass; and (3) Barley, Crimson Clover, and Early Amber Sugar Cane.

In 1903, an experiment was conducted with two mixtures, one of which was thought to be especially suitable as a pasture for cattle, and the other as a pasture for hogs. The mixture for cattle pasture comprised Oats, Hairy Vetches, and Crimson Clover. The crop was cut twice during the season, and produced a total of 23.5 tons of green crop per acre. The mixture for hog pasture comprised Hairy Vetches, Common Vetches, and Rape and was cut twice during the season, producing a total yield of 20.9 tons of green crop per acre.

Grasses and Clovers for Pasture.

Some very interesting experiments have been started to determine the relative amount of pasture produced by different varieties of grasses and clovers throughout the summer season. These experiments have not been completed, and the results will be held until some future occasion.

Mixtures of Grasses and Clovers for Hay Production.

An experiment was conducted with twenty-one mixtures of grasses and clovers from 1897 to 1899, and was repeated from 1898 to 1900, and again from 1901 to 1903. The experiment was conducted in duplicate from 1901 to 1903. We, therefore, have the average results of four distinct tests, each running for a period of three years. The grass mixtures were sown with a grain crop in every case. The yields of hay produced from each plot in the second and third years of the experiment were carefully determined. Most crops produced two, and a few produced three cuttings in each season. Four different clovers and four different grasses were used. There were sixteen mixtures with one clover and one grass in each mixture, four with two clovers and two grasses in in each mixture, and one mixture was composed of four clovers and four grasses in

combination. The average results of each of the sixteen mixtures having two varieties in each mixture are here presented. It will be understood that these results show the average of four distinct tests made within the last seven years :

Mixtures of Grasses and Clovers for Hay Production.

Mixtures.	Average number of tons of Hay per acre for each cutting. Four experiments each three years, no cutting first year, three cuttings in each of the other two years, making in all 24 cuttings.						Tons of Hay per acre for each year.		
	2nd year.			3rd year.			2nd year, 4 tests, 12 cuttings.	3rd year, 4 tests, 12 cuttings.	Average 2nd & 3rd years 4 tests, 24 cuttings.
	1st cutting.	2nd cutting.	3rd cutting.	1st cutting.	2nd cutting.	3rd cutting.			
Lucerne, Tall Oat	2.50	1.56	.31	2.54	1.33	.58	4.37	4.45	4.41
Lucerne, Timothy	2 48	1.35	.20	2.61	.90	.45	4 03	3.96	4 00
Lucerne, Orchard	2.33	1.52	.24	2.09	1.03	.47	4 09	3.59	3.84
Lucerne, Tall Fescue....	2.04	1.33	.22	2.14	1.28	.54	3.59	3 96	3.78
Mammoth, Tall Oat	2.93	1.62	.....	2.05	.50	.....	4.60	2 55	3.58
Mammoth, Timothy....	2.86	1.62	.....	2 22	.33	.....	4.48	2.55	3.52
Mammoth, Tall Fescue .	2.75	1.81	.....	1.85	.45	.....	4.56	2 30	3.43
Common Red, Tall Oat.	2 46	1.65	.....	1.95	.71	.....	4 11	2.66	3.39
Common Red, Timothy.	2.25	1.42	.....	2.18	.54	.....	3.67	2.72	3.20
Mammoth, Orchard	2.63	1.73	.....	1.50	.40	.....	4 36	1.90	3.13
Common Red, Tall Fescue	2 08	1.52	.....	1.92	.69	.....	3 60	2.61	3.11
Alsike, Tall Oat	2 60	1.36	.....	1.88	.26	.....	3 96	2.14	3.05
Common Red, Orchard..	2.34	1.50	.....	1.36	.54	.....	3.84	1.90	2.87
Alsike, Orchard	2.28	1.42	.....	1.55	.30	.....	3 70	1.85	2 78
Alsike, Tall Fescue.....	2.31	1.05	.....	2 01	.18	.....	3.36	2.19	2.78
Alsike, Timothy.....	2.14	.89	.....	2.13	.07	.....	3 03	2 20	2.62
Average.....	2.44	1.46	.06	2 00	.59	.13	3.96	2.72	3.34

The average annual production of hay per acre from all the different mixtures included in the experiment under consideration was 3 1-3 tons. The average yield of hay in the second year after the seed was sown was 4 tons, and in the third year, 2.7 tons per acre. It will be seen that the Lucerne and the Tall Oat Grass gave 4.4 tons, being the greatest average yield of hay per acre. The mixture of Lucerne and Tall Oat Grass furnished three cuttings each year. They both start early in the spring, are ready to cut about the same time, and produce excellent aftergrowth. The Orchard Grass is undoubtedly somewhat lower in yield than it would have been had it not become slightly winnter killed in two out of the four tests. This, however, seems to indicate that the Orchard Grass is not quite as hardy as the three other varieties of grasses, included in this experiment.

Mixtures of Hardy Grasses and Clovers for the Production of Either Hay or Pasture.

A large amount of experimental work has been done in testing varieties of grasses and clovers, both singly and in combination, within the past twenty-seven years. The grasses and clovers have been carefully studied, and much information has been gleaned in regard to their value for hay and also for pasture. In 1885, Prof. Wm. Brown, who was then Farm Superintendent at the Ontario Agricultural College, recommended a mixture which he thought well adapted for permanent pasture. Only the most hardy varieties which had been tested up to that time were included in the mixture. In 1893, after eight years additional experimental work, during which time the writer was closely connected with the work of the Experimental Department, another mixture was recommended, containing a smaller number of varieties and requiring a smaller amount of seed per acre. The grasses and clovers recommended in 1893 have proven themselves to be a valuable mixture. They are all hardy varieties, and when grown to-

gether give a large yield. An experiment was started in the spring of 1894 by sowing a plot of the mixture which was recommended in 1885, and a plot of the mixture which was recommended in 1893. The seed was sown with a light seeding of barley ; and the germination of the seed of the grasses and clovers was quite satisfactory.

Mixtures of Grasses and Clovers.

Mixture recommended in	Grasses and Clovers.	Varieties in mixtures.	Amount of seed per acre.	Average height of 1st cutting for 9 years.	Yield of Hay per acre.	
					1903 2 cuttings.	Average for 9 years, 21 cuttings.
1885	Grasses	Meadow Fescue	6	32 3	3.44	4 47
	"	Meadow Foxtail	3			
	"	English Rye	2			
	"	Timothy	3			
	"	Canadian Blue	4			
	"	Orchard	3			
	"	Red Top	2			
	"	Yellow Oat	2			
	Clovers	Lucerne	4			
	"	White	2			
	"	Alsike	2			
	"	Red	1			
	"	Yellow	1			
			35			
1893	Grasses	Orchard	4	36.4	4.28	5.14
	"	Meadow Fescue	4			
	"	Tall Oat	3			
	"	Timothy	2			
	"	Meadow Foxtail	2			
	Clovers	Lucerne	5			
	"	Alsike	2			
	"	White or Dutch	1			
	"	Yellow or Trefoil	1			
			24			

Two cuttings were made from each plot in 1895, and from two to three cuttings have been secured in each of the years since that date. In 1903, which is the tenth year since the plots were sown, two cuttings were taken from each plot. The total yield of hay produced from the two cuttings was 4.3 tons from the mixture recommended in 1893, and 3.4 tons from the mixture recommended in 1885. The figures represented in this report show the comparative yields of hay from the two mixtures. They also show that the grasses used for the mixtures are very suitable for the climate of Ontario. These mixtures can be used for the production of either hay or pasture, but are more suitable for pasture purposes, owing to the unevenness in the maturity of the different varieties, which is a detriment to hay production, but an advantage when the crop is used for pasture purposes. Without a single exception, the mixture which was recommended in 1893 has produced a larger yield per acre than that which was recommended in 1885. We have named all the varieties of grasses and clovers sown in each mixture, and also the quantity of seed per acre, particularly for two reasons. In the first place, that this experiment might thus be as clear as possible, and in the second place, that any person wishing to know the quantity of seed per acre of the different varieties which are recommended as a permanent pasture mixture could find the information in good form. It will be observed that the mixture recommended in 1893 possessed none but very hardy grasses and clovers, which have been tested at the College more or less for about twenty-five years. This mixture could, of course, be somewhat modified to suit different localities and different soils.

ACKNOWLEDGMENTS.

I wish to acknowledge the valuable services rendered during the past year by my foreman, Mr. A. E. Whiteside, in looking after the details of work of the department; by my assistant, Mr. W. J. Squirrell, in the office work; by Mr. J. Buchanan, B.S.A., in the work of plant breeding, and by Mr. L. H. Newman, B.S.A., in assisting with the farmers' excursions which came to the College in the month of June.

I wish to thank both yourself and the Minister of Agriculture for the kindly support given me in the work of the Experimental Department during the past year.

Respectfully submitted,

C. A. ZAVITZ,
Experimentalist.

PART XIV.

THE MANAGER OF THE POULTRY DEPARTMENT.

To the President of the Ontario Agricultural College :

Sir,—I have the honor to present herewith the report of the Poultry Department for the year 1903 :

The usual course of lectures was given to the regular College students and the Farm Dairy class.

The attendance at the Short Course in Poultry Raising was not so large this year as the previous year, but was plenty large enough to do satisfactory work. When the class is small, much more satisfactory instruction can be given, especially in practical work.

Special lectures in the Short Course were given by Wm. McNeil, London; J. E. Meyer Gourock; W. J. Bell, Angus; L. H. Baldwin, Deer Park; and A. W. Tyson, Guelph.

The increasing interest taken by farmers in poultry raising, as was noted in last year's report, has been well sustained throughout the year. Eggs and dressed poultry have brought good prices, the increase in prices being most noticeable in the local markets. The community at large appears to be consuming more eggs and poultry; and this stimulates our home markets, which is what we want.

This has been a more satisfactory year in every respect than any other since I have been in charge of the Poultry Department. Our birds have done better as regards egg production, and the young stock raised has been of a better quality than in previous years. This is quite encouraging. I hope in the next few years to have a larger number of first-class birds of the various breeds as regards both exhibition and utility points. We have such birds now, but not so many as we hope to have in the near future.

Hatching Eggs in January.

We set about 1,000 eggs during the month of January. The eggs this year were better than in 1901. A larger percentage of them were fertile, and, as might be expected, a larger number of good strong chicks were hatched. It took about three and one-half eggs, on an average, to produce a chicken. Later in the year it did not take over half as many; for, as a rule, eggs that are laid in cold weather are not extra good for hatching. It is encouraging to find that as we give the birds more fresh air and exercise, together with plenty of wholesome food, the strength of the germs increase, which gives us a chicken that is easier and more profitable to raise. As yet, I would not care to advise any one to go extensively into broiler raising in Ontario, especially when eggs are selling at 25 cents a dozen or better. With a lower price for eggs, there may be fair reasons to venture, if one has buildings suitable for the work.

Later Hatching.

We used both the hens and the machines for hatching eggs in the natural season. Many of the chickens we hatch at this season of the year are from eggs laid by hens,

having some characteristic we wish to perpetuate. We find it more convenient to hatch such eggs under hens than in machines, as the chicks are more easily marked and distinguished when hatched in this way. Usually the setting is made of eggs from two or more individual hens, representing different varieties. It is always well to set the eggs while they are fresh; and by following the above plan, we can usually manage to have the eggs set before they are ten days old. We use a common leather punch for marking the chicks. The web between the toes is punched usually when the chicks are three days old. These holes seldom grow up; and they enable us to determine a chicken's breeding at any stage in its life.

Experiments with Incubators.

This is the first year that we have done any work along this line. We have not accomplished very much, but we have secured a good deal of data that can be used in 1904, from which data we hope to reach some conclusions that will be of use to poultry raisers.

During the term of the Poultry School class, the eggs in a 120-egg incubator were divided into three lots: 50 per cent. of the eggs were laid in the tray on their side, which is the usual plan; 25 per cent. were placed with the small end up, and 25 per cent. with the large end up. The 44 fertile eggs placed in the ordinary way hatched 27 chickens; the 25 fertile eggs placed with the large end up hatched 10 chickens; and the 25 fertile eggs with the small end up hatched 7 chickens, two of which were cripples.

The results of this trial appear to indicate that eggs for incubation should lie in the natural way, that is, on their sides. Some incubator operators are not particular about this in the management of their machines; and the result is a considerable number of chickens dead in the shell, which is specially noticeable in eggs placed with the small end up.

Experiments were also conducted with oxygen gas. It has been claimed by some authorities that by introducing oxygen gas into the hatching chamber, every fertile egg can be hatched. We tried introducing the gas direct into the chamber and by passing it into the machine with the hot air, after which it diffused through the diaphragm to the eggs.

We encountered several difficulties in this experiment, the most serious of which was to get a constant supply of gas without using more than was thought necessary. In the first trial, conducted in January, about two quarts of gas was forced from a gasometer into a 120-egg machine, each day after the fifth day of incubation. No gas was put in after the eggs chipped. The results of this trial were very poor. A machine of the same make, filled with as nearly as possible the same kind of eggs, hatched considerably better. The oxygen machine hatched 27 chickens from 89 fertile eggs, while the machine run in the ordinary manner hatched 44 chickens from 94 fertile eggs; and practically every chick was killed and sold from the machine run in the ordinary way, while those hatched from the oxygen machine all died, but one or two,—many died during the first ten days of their lives. The chicks were all placed in the same brooder, and fed exactly the same.

It was noticed at the first test of the eggs, on the eighth day of incubation, that some of them showed what is known as the "blood ring," that is, a ring of blood encircling the embryo. This is always considered a sign of trouble later on. The oxygen appeared to be too much of a stimulant, causing abnormal growth of the germ, which often resulted in the rupturing of the blood vessels of the germ.

Two trials were made later in the season, with less gas at later periods of incubation. These were not so unfavorable as the first trial; yet each trial was characterized by smaller hatches and poorer chicks than were obtained from machines run in the ordinary way.

A Cold House.

In November, 1902, it was decided to put some fowls into a cheap, cool, airy house and test their egg production. An exact account of the feed was kept and the results carefully tabulated, as shown below.

The house selected was one of the old colony houses, which are 14 feet long and 10 feet wide. They are about 5½ feet high at the back and 8 feet at the front or south side. They are built of single-ply boards, and the cracks are battened. The building is not sheeted on the inside, except where the roosts are placed; and there a box-like arrangement was constructed in the following manner: The north or back wall was sheeted with matched lumber, about one-half way across the building. In front of this was built a stand of 2x4 scantling the full length of the sheeting and three feet wide. The bottom of this stand is 2 feet clear of the ground, and the ends of the box are sheeted with matched lumber, thus enclosing the roost coop on all sides, with the exception of the front. The roof extending over the roost coop is also sheeted and the space between the rafters stuffed with straw. The intention was to hang a curtain in front of the roost coop to be let down at night; but this was never put on, as the hens appeared to do well without it. There are two windows about 2 feet square in the front side of the house. A piece of cotton was tacked over one of these, and the window pulled back about half way; the other window was kept closed. The open window gave a constant supply of pure cold air.

This house appeared to be very cold; the water froze very quickly in cold weather; in fact, it often required replenishing four or five times a day. We kept a record of the minimum temperature in the house; and the lowest recorded temperature was 9 degrees above zero. This, of course, was exceptional; but 15 to 24 degrees above was very common.

The flock consisted of 18 hens. Two of them were selected from a farmer's waggon on its way to market,—ten of his culls. This much, however, was in their favor, they were in fairly good feather. The other eight consisted of high-grade Leghorns, Plymouth Rocks, and Wyandottes.

The flocks remained healthy throughout the twelve months, with the exception of one hen, which died of indigestion in March.

In April, two of the hens were allowed to sit and rear chickens. Twenty chickens were raised by the two hens. These chickens were kept in the yard of the old flock, and did not do so well as chickens of the same age that had more or less of a free-range; but, notwithstanding this disadvantage, they matured fairly well, and the pullets should lay this winter. The yard surrounding the pen is 150 feet by 40 feet.

The following table shows the feed consumed by both hens and chickens:

Wheat	480	lbs. at	70	cents per bush.		$5 60
Corn	335	"	56	"		3 35
Barley	271	"	48	"		2 71
Wheat bran	69	"	85	cwt.		58
Shorts	69	"	$1 00	"		69
Corn meal	13	"	1 15	"		15
Oat meal	20	"	1 25	"		25
Clover meal	10	"	1 50	"		15
Stale bread	100	"	1 00	"		1 00
19 beef heads at 10 cents each						1 90
30 lbs. beef scrap at 3 cents per lb						90
2 bags of roots at 15 cents per bag						30
300 lbs. (estimated) skim-milk at 10 cents per cwt.						30
Total						$17 88

No charge is made for grit, as there was an abundance of gravel and soft coal ashes in and around the building. These materials make fairly good grit.

In the following table is given the number of eggs laid each month and the selling price of the same ; the price of eggs is taken from the Guelph market :

Month.	No. hens in pen.	Eggs laid.	M. P. per doz.	Amount.
			cents.	$ c.
December	18	167	24	3 34
January	18	149	24	2 99
February	18	167	18	2 51
March	17	281	15	3 51
April	17	269	11	2 46
May	17	191	12	1 91
June	17	184	12	1 84
July	11 (killed and sold 6 hens)	127	15	1 59
August	11	112	15	1 40
September	11	90	18	1 35
October	6 (killed and sold 6 hens)	26	20	43
Total				23 33

Stock sold :

July—6 hens, 25 lbs. at 8 cents per lb	$2 00
August—6 cockerels, 22 lbs. at 9 cents per lb	1 98
October—5 hens 22 " 9 "	1 98
November—1 cockerel, 6 lbs. 7 "	42
Total	$6 38

Total sales	$29 71
Cost of feed	17 83
Profit	$11 88

Note.—The hens were sold dressed weight and the chickens live weight.

This is a fair profit from what might be considered an inferior flock. The hens that were purchased from the farmer might have been two years old or seven years old. The age is not known ; but they were considered to have outlived their usefulness.

It will be noticed in the above statement that there is no allowance made for the eggs set. These were taken from our best pen of Wyandottes in our regular houses. These eggs, if sold, would be worth $3.00. They are not charged up against the flock, as I sold one cockerel from this yard for $3.00.

The pen for 1904 consists of 10 White Wyandotte pullets and 8 cross-bred yearling hens.

General Treatment of Breeding Stocks.

Our system in 1903 was much the same as in 1902,—if anything, we aired the houses more freely. The stock in general, has been good health, and the egg production above the average. In fact, we had one pen of Wyandottes this year that made a greater average per hen than any pen of birds since I had charge of the department. They laid a little over 179 eggs from December, 1902, to December, 1903. Some eggs were laid every day in the twelve months.

The fresh air system is not so favorable for winter egg production from Leghorns, Minorcas, etc., as from Wyandottes, Orpingtons, and such like birds. The lighter breeds appear to feel the cold much more.

We have practised to some extent the system of not allowing yearling hens intended for breeders to lay during the winter. The idea is to have the hens in the pink of condition, with plenty of vigor in the spring. I am inclined to favor this plan, and depend largely on April and May pullets for winter layers.

Andalusian Fowls.

I wish to call the attention of all purchasers of eggs from this breed of fowls to the fact that Andalusians do not breed true to color; that is to say, from a setting of eggs you may expect blue chickens,—the natural color,—and black chickens, and white-and-blue chickens.. Several purchasers of eggs in the past have thought they received eggs of mixed breeds, whereas the different colors in the chicks are natural. I sincerely hope that all intending purchasers will bear this in mind.

Ducks

We had several inquiries as to how much feed a duck would eat from the time it was hatched until it was ready for market, that is, about ten weeks of age. Some farmers doubted if it was more profitable to kill and sell the ducks when first feathered, than to hold them until Christmas.

Fifty-one ducks were taken from an incubator on May 29th and placed in a brooder. There were 29 Pekins, 22 Rouens, and Crosses between the Pekin and Indian Runner ducks. The brooder was heated for the first week only; as the ducks, after the first two or three days, appeared to be very indifferent as to whether there was any heat or not; so not over three quarts of oil was used. No charge is made for this, the object being to keep account of the grain and other materials consumed. The young ducks were carefully yarded and an accurate account kept of the feed they consumed, with the exception of grass. They grew more or less in the yard, and the ducks helped themselves. No charge has been made for the grit, because most farmers have an abundance of coarse, sharp sand, or fine gravel, which serves the purpose in the feeding of birds. But, making an estimate, I would say that they consumed about 100 pounds of grit, which would be worth about 75 cents.

During the first week the ducks were fed alternately on bread and milk and on corn meal, shorts, and bran in equal parts, with some grit added in each case. The latter was scalded with boiling water. The second week the ducks were fed the corn, shorts, and bran ration, moistened with milk, and had in addition a small amount of beef scrap. This ration was continued until the ducks were four weeks old, when the bran and beef scrap were left out of the ration. The intention was to use some beef scrap; but at the time, we were unable to procure any, and it was left out of the ration.

The ducks weighed, when six weeks, old, 171 pounds, or an average of about 3 1-3 pounds each, and had consumed 130 pounds of corn, 130 pounds of shorts, 25 pounds of bran, 14 pounds of stale bread, and 15 pounds of beef scrap.

The grain was figured at the following prices per 100 pounds: Corn, $1.15; shorts, $1.00; bread, $1.00; bran, 90 cents; beef scrap, $3.25; skim-milk, 10 cents.

From the sixth to the eighth week, the ducks consumed 310 pounds of shorts and corn, and an equal amount of milk.

They weighed 239 pounds, or on an average of better than 4 1-2 pounds each.

At nine weeks, they weighed 261 pounds, and during the week had consumed 139 pounds of grain, and an equal amount of milk.

At this age the ducks were ready for market. They were in good feather, and should have been killed. However, we killed only six of the flock and fed the remainder for another week.

From the ninth to the tenth week the forty-five remaining ducks consumed 130 pounds of grain, and an equal amount of milk. During this week the ducks lost 7 pounds in weight, as they began moulting heavily at the beginning of the week. All but thirteen of the ducks were killed at the end of the tenth week. They were sold f.o.b. Guelph at 12 cents per pound. We found in dressing that the ducks lost about 3-4 pound per pair. The necks were pulled in the same manner as the chickens are killed. Had the ducks been bled, no doubt there would have been a greater

shrinkage. After deducting the cost of grain, bread, beef scrap, and milk only, from the selling price, it leaves a profit of nearly 34 cents on each duck. Had we killed all the ducks at the ninth week, there would have been a profit of 38 cents each.

During the eleventh week the remaining 13 ducks consumed 27 pounds of grain, and an equal amount of milk, and they gained only two pounds in weight.

There was not much gain made by the ducks until after the new feathers had been fairly well grown. In fact, the cost of the feed eaten each week after the ninth amounted to more than the price of pounds of gain made during the week.

From this trial it is very evident that when ducks become well feathered, that this is the most profitable time to sell them; and, secondly, that the growth made after the ninth or tenth week will seldom leave any margin of profit, after deducting the cost of feed.

The keeping of spring ducks for Thanksgiving or Christmas trade, where one has to feed them constantly, is a losing game; but if ducks are sold when they are first ready, there is likely to be a good margin of profit.

As regards the breeds of ducks in this experiment, I may say that the Pekins and crosses between the Indian Runner and Pekin matured the fastest. They were ready to kill fully one week in advance of the Rouens.

Experiment in Fattening Chickens.

The following tables give the results of the experiment in fattening:

How fed.	Ration.	No. of birds.	Weight at beginning of experiment.	Pounds of gain in two weeks.	Pounds of grain consumed.	Cost of grain.	Lbs. of grain to make 1 lb. gain.	Lbs. of milk consumed.	Cost of milk 10c. cwt.	Pounds of skim-milk substitute.	Cost.	Total cost.	Cost of one pound gain.
													cts.
Fed in crates..	Grain and milk....	12	40.	15.	43.50	54.37	2.9	65	6.5	.....	.....	60 87	4.
	"	12	37.75	15.25	37 75	46 87	2 4	55	5.5	... ..	....	52.37	3.4
	"	12	52.	15.	45.37	56.7	3.02	68	6.8	.....	.....	63.5	4.2
	Average.....	..	...	15.08	42.20	52.64	2.77	62.6	6.26	.....	.....	58.91	3.9
Fed in loose pen	Grain and milk	12	51	14	45.37	56.7	3.24	68	6.8	.....	.....	63.5	4.5
	"	12	40 5	15	48.50	54.37	2.9	65	6.5	.....	.....	60.87	4
	Average	..	.....	14.5	44.43	55.5	3.07	66.5	6.65	.....	... ..	62.18	4.25
Fed in crates..	Grain and tankage	12	36	16	35.25	44	2.2	....	....	7.50	15	59	3.62
	"	12	49	14	35	43 75	2.5	...	....	6.81	13.63	57.38	4.09
	Average.....	.	.....	15	35.12	43.87	2.35	....	....	7.15	14.31	58.19	3.85
	Grain and blood meal	12	54	10	34.62	43.33	3.45	....	....	6.81	18.76	62.08	6.2
	"	12	48	12.5	36.37	45.5	2.9	....	....	4.25	11.68	57.18	4.57
	"	12	37.5	12	35.25	44	2.9	....	....	5	13 68	57.68	4.8
	Average.....	..	.....	11.5	35.41	44.27	3.08	....	....	5.35	14.7	58.98	5.19
Fed in crates	Grain and Morgan's animal meal....	12	52.5	16.5	41.12	51 40	4.49	....	....	8.7	21.75	73 15	4.4
"	Grain & beef scrap.	12	35	15	34.50	43	2.3	....	....	7.3	23.66	66.6	4.4
"	Grain, milk & animal meal	12	53	14	37.25	46.56	2 66	56	5.6	8.12	20 31	72.47	5.17
	"	12	53	18	42.8	53.5	2.36	64	6.4	3.5	8.75	68.65	3.8
	Average.....	.	....	16	40	50	2.51	60	6	5.81	14.53	70.56	4.48
"	Potatoes, shorts & milk	12	56	9	31	31	3.4	47	4.7	31	16	51.7	5 7
Fed in loose pen	Potatoes, shorts & milk	12	54.5	10.5	31.12	31.12	2 95	47	4.7	31 12	16	51 8	4.9

This year we have followed along much the same lines as last year. We have tried several substitutes for skim-milk in the fattening ration; and there are one or two which, from this season's trials, appear to be commendable.

The results of the experiments in "pen feeding" versus "crate feeding," are different from anything we have had hitherto; but the difference is largely accounted for by the fact that we succeeded last year in getting the birds in the pens to eat as much as the birds in the crates. In fact, the ate practically the same amount for the period of feeding, although some days one lot ate slightly more than the other.

The pens in which the chickens were fed were 7 ft. by 12 ft., and were well lighted. Twelve chickens were placed in each pen; the chickens were allowed no range out of doors, and very careful attention was given to see that they were not over-fed during the first week. This is very important in either crate or pen feeding.

The grain ration fed consisted of 2 parts finely ground oats, 2 parts of finely ground buckwheat, and 1 part of finely ground corn. This ration cost $1.25 per 100 pounds; the skim-milk cost 10 cents per 100 pounds, and the beef scrap used cost $3.25 per 100 pounds; but in ton lots the latter could be purchased much cheaper. We figured the blood meal and tankage at more than they actually cost, as we were able to get them wholesale. We have charged $2.75 per 100 pounds for the blood meal, and $2 per 100 pounds for the tankage. At these prices there would be a good margin of profit for a dealer. Our reason for charging more than they actually cost us is that many persons would be obliged to pay these prices; and furthermore, the other animal foods used were purchased at dealers' prices. We have charged $2.50 per 100 pounds for Morgan's animal meal The potatoes cost 45 cents a bag, or 50 cents per 100 pounds, and the shorts $1 per 100 pounds.

The crate-fed birds made a pound of gain cheaper than the birds fed in pens; but if we deduct the second trial in crate-feeding, then the cost of a pound of gain is about equal.

The chickens fed on the potato ration did better in the pens.

It is evident from these trials that good growthy chickens, weighing a little more than three pounds each, are more profitable feeders than larger birds.

Of the different substitutes used for skim-milk, I would recommend "Digester Tankage," sold by Swift & Co., of Chicago, and A. J. Morgan's "Animal Meal," which can be obtained from his office in London.

"Blood Meal" did not give nearly so good returns; and furthermore, these rations were not relished by the chickens.

"Beef Scrap" gave very good returns; but at sixty to seventy dollars per ton, it is too expensive.

The potato and shorts ration is only a fair one, but no doubt would be very convenient for many farmers; and where the market demands a half-fat chicken, this ration is worthy of consideration.

The feeding of both animal meal and skim-milk does not appear to have any particular advantage over the feeding of either one singly with the grain ration.

I wish to thank both yourself and the Minister of Agriculture for the assistance that you have given me in many ways.

Respectfully submitted.

W. R. GRAHAM.
Manager of Poultry Department.

PART XV.

THE LECTURER ON APICULTURE.

To the President of the Ontario Agricultural College :

Sir,—I have the honor to present herewith my report on the work in the Department of Apiculture.

The usual course of eighteen lectures was given in the fall term to the first year, and as the weather was very warm, I was able to make frequent use of bees in practical demonstration.

Storing Honey for Granulation.

In the United States, great use has been made of paper bags coated over with paraffin wax for the purpose of storing honey in them. When the honey has granuated the paper is torn off, and the lumps of granulated honey are ready for market. This plan has several defects : the bags can be used but once ; if the bags are small, the amount of wax required per ton of honey is very great ; and this year sufficient bags could not be procured.

This year I built a tank six feet long, three feet wide, and two feet deep. The material was ordinary flooring, the dressed side being used for the inside of the tank. The sides, ends, and bottom were each a separate section, i.e., the flooring was held together by cross pieces, so that each section (either bottom, side, or end) looked like a barn door. The tank is held together by four clamps, of which only one is shown in Fig. 1 (p. 160). The clamps are made of two by four inch scantling spiked together. The tank is placed within the clamps, which are an inch wider than the tank at each side, and the parts of the tank are held closely together by driving wedges between the sides and the clamps. To prevent the ends from being pressed outwards, cleats are nailed on the sides and bottom. The outside was painted to prevent shrinking and the inside coated over thickly with paraffin wax as a provision against leaking.

When the honey in the tank had granulated, the wedges were removed and the sides and ends taken away, and a solid cake of granulated honey, weighing a ton, was left. The cake was divided into pieces of various sizes by drawing a wire through it, as grocers cut cheese.

Swarming.

The immense labor connected with swarming has, more than anything else, prevented beekeepers, with a few exceptions, from extending their business to a much larger scale. The following different methods of preventing swarming were tried :

Three combs of capped brood were lifted out of the brood chamber and placed in the extracting super. Their place was filled by inserting frames filled with full sheets of foundation. This did not retard swarming, and there was the annoyance of having queen cells started in the extracting super, as it is difficult to find brood combs without eggs. In those colonies where the three brood combs were "lifted" earlier in the season, queen cells were not started in the supers; but, so far as could be seen, swarming was not delayed.

The same method was tried with other colonies, with the exception that frames with starters, instead of full sheets of foundation, were placed in the brood chambers. This did not retard swarming in the least, and drone comb was built on the starters. Often swarms issued before very much comb had been built.

Again, swarms both natural and artificial were placed in a dark cellar for two days and then returned to the old hive after the queen cells had been torn out and an empty hive had been placed under the brood chambers. Twenty per cent. of these swarmed out again. It must be taken into account, however, that swarming this last summer (1903) was very severe.

Taylor swarm catchers were provided and a person employed to watch a yard; and in this way the swarms were caught and were hived by myself in the evening. When two swarms commenced to issue at the same time, cloths were stuffed into the entrance of the hives and the swarms confined there for ten or fifteen minutes without any apparent injury. Then, when the operator was ready, "catchers" were placed in position, the cloths snatched away and the swarms issued into the "catchers." This method worked very well; but it required a person to watch each yard.

Again wedges were placed between the hive bottom and brood chamber and another pair of wedges between the queen excluder and extracting super, making two very deep entrances for each hive. This retarded swarming, but did not prevent it.

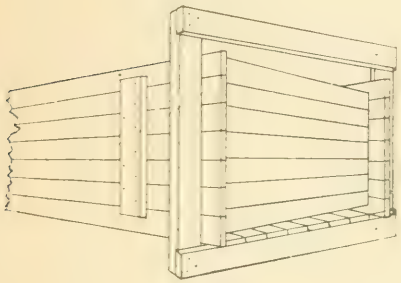


Fig. 1.

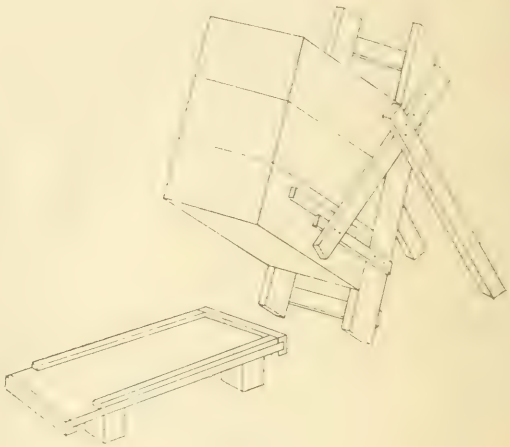


Fig. 2.

"Shaking swarms" was practised; but to take off each extracting super and the queen excluder and then take out the combs of the brood chamber, to see if queen cells had been started, involved infinite labor; and to do away with this, I made a truck, after the manner of the one shown in the illustration (Fig. 2). The cleat on the truck is slipped underneath the cleat, which is nailed to the hive. The bottom board is pried loose and the truck is tilted backwards until the back legs rest upon the ground. Thus the different parts of the hive are not displaced. By smoking, the brood frames are cleared of bees; and the bottoms of the combs may be easily examined to see if queen cells have been started, the majority of which are built on the bottoms of the combs. If cells are seen, the colony has the swarming impulse and the swarm is "shaken." By using this truck, I searched the hives for queen cells every six days, with very little labor; "shook swarms" where it was required; and left the other colonies which were set apart for this experiment, alone for another six days.

In conclusion I may say that I prefer to handle swarms after the last method, to the exclusion of the other expedients herein enumerated.

Respectfully submitted,

H. R. ROWSOME,
Apiarist.

PART XVI.

THE LIBRARIAN.

To the President of the Ontario Agricultural College :

Sir,—As College Librarian, I have pleasure in submitting a brief report for 1903.

Aided by a larger appropriation from the Legislature, we have been able to buy more books during the past year than formerly. 1,125 have been added, compared with 639 of the year 1902. We have purchased back numbers of the following periodicals, which, with the numbers we had on our shelves, complete the sets: Journal of the Royal Microscopical Society, Journal of the Chemical Society, Arboretum and Fruict, Popular Science Monthly, Zeitschrift fuer Hygiene. The Canada Farmer, Zeitschrift fuer pflanzen krankheiten, Le Naturaliste Canadien, Saccardo' Sylloge Fungorum, Berlese Icones Fungorum, Science, Veterinary Journal.

We desire to acknowledge the following gifts from the Education Department, Toronto : Documentary History of Education in Upper Canada, by J. G. Hodgins, Vols. 2-10; also some miscellaneous books on Agriculture. We also wish to express our appreciation of all our exchanges, especially those of the United States Department of Agriculture and various Experiment Stations in America, India, Australia and Europe.

The 1,125 books added to the Library during the year are classified as follows :

Agriculture (including 31 bound periodicals)	80	Physics	41
Agricultural Reports	110	Entomology	25
Horticultural Reports	18	Chemistry (including 88 periodicals)	109
Botany	57	Veterinary Science	35
Geological Reports	7	Domestic Science	11
Nature Study	7	English Literature	45
General Science	85	Economics	14
Horticulture (including 13 bound periodicals)	44	Hygiene	51
Dairying	22	Entomology Reports	5
Geology	6	Zoology	27
Poultry	7	Bacteriology (including 12 bound periodicals)	30
Biology	12	Forestry	11
Science Reports	46	Technology	25

The number of books bound was 369.

The Library received by purchase, or exchange, 150 periodicals, most of them bearing on agriculture.

The total number of bound books on our shelves is 11,146, and between four and five thousand pamphlets.

In order to make the publications of the Ontario Department of Agriculture more accessible, so that anyone can quickly look up a given subject, we have commenced to card-index all the publications of the Department. This work will necessarily take considerable time; but some progress has already been made.

The author and subject cards are written for each title, and as much information as possible is placed upon the card, so as to give the person a good idea of the manner in which the indexed article is treated. Miss Rowsome has had this work in charge ; and I desire to place on record my appreciation of her efficient services in the Library during the past year.

Mr. W. T. Milligan has had charge of the book delivery and has rendered satisfactory service.

Respectfully submitted,

F. C. HARRISON,
Librarian.

PART XVII.

THE PHYSICIAN.

To the President of the Ontario Agricultural College :

Sir,—I have the honor of presenting to you my tenth annual report.

As in the past I have made the required inspection of the students at the opening of the College and Dairy School.

On reference to my records I find the usual frequent occurrence of tonsilitis, bronchitis, influenza, digestive disorders, etc., amongst the students during the winter months. We had also one case of acute lobar pneumonia taken to the General Hospital here, where the patient made a good recovery.

In the month of March we were threatened with an outbreak of smallpox. A young man consulted me with regard to an eruption which was determined to be varioloid. He was isolated in the smallpox hospital of this city, and vaccination of all unprotected persons carried out, and other preventive measures put into effect, with the fortunate result that no further spread of the disease took place.

An instance of septic infection occurred, in the foot of one of the students, and, though the case seemed quite serious, the patient made a good recovery.

I regret to report the death of a most promising young man from acute intestinal obstruction, in the month of December, under very sad circumstances.

Among the numerous casualties occurring in the College, I may mention a fracture of the malar bone in a football game as perhaps the most serious received.

On my inspection I found everything about the College in the usual sanitary condition.

Respectfully yours,

W. O. STEWART,
College Physician.

Guelph, Dec. 31st, 1903.

FINANCIAL STATEMENT, 1903.

I. COLLEGE EXPENDITURE.

(a) College Maintenance.

1. *Salaries and Wages*	$29,883 57	
2. *Food* :		
Meat, fish and fowl	6,347 00	
Bread and biscuits	1,182 88	
Groceries, butter and fruit	6,470 69	
3. *Household Expenses* :		
Laundry, soap and cleaning	393 59	
Women servants' wages	2,197 41	
4. *Business Departments* :		
Advertising, printing, postage and stationery	1,788 93	
5. *Miscellaneous* ;		
Maintenance of Chemical Laboratory	644 09	
" Physical "	342 09	
" Biological "	520 73	
" Bacteriological Laboratory	376 56	
Library and reading room,—books, papers, etc	2,047 32	
Scholarships	90 00	
Short courses in Judging	290 82	
*Telephone service, rent and messages ($234.35)	246 45	
School assessment: S.S. No. 7	110 40	
Temporary assistance	473 78	
Travelling expenses	586 42	
Student labor	3,850 31	

(b) Maintenance and Repairs of Government Buildings.

Furniture and furnishings	1,211 89	
Repairs and alterations	2,019 70	
†Fuel	12,620 56	
Light	209 03	
Sewage disposal	462 80	
Museum (birds and insects, Biological Department)	239 35	
J. W. L. Forster, painting, Sir Wm. Macdonald	250 00	
Macdonald Institute (staff, fuel, etc.)	3,482 94	
Unenumerated	806 41	
		$79,139 72

College Revenue.

Fees	4,303 50	
Board accounts	16,043 07	
Supplemental Exams	48 00	
Rent of post office boxes, Sept. 1903 to Sept. 1904	44 00	
Rent of Houses	100 00	
Contingencies	8 66	
Sale of coal to engineer—during coal famine	17 67	
Breakages	39 35	
Fines (College)	139 00	
" (Library)	17 30	
Chemical Laboratory (sale of alkaline solution)	158 00	
Analysis of city water	4 00	
Macdonald Institute (fees and tuition)	285 00	
		21,207 55
Net expenditure		$57,932 17

* Telephone service, etc., transferred to Miscellaneous in Audit Office Report to balance.

† A great increase due to the scarcity and exceptional price of coal owing to strike last winter and the addition of the new Massey Hall Library and the Biological and Physical Laboratories, the cold storage ice machine and the new stock pavilion.

Laying in of a supply January, February and March, 1904. This latter is due to the fact that the street railway cannot haul coal during the winter and teaming it from the city costs 20 cents per ton extra.

STUDENT LABOR, 1903.—To Different Departments.

Totals per month.		*Analysis per year.*	
January	$ 344 02	College	$ 113 72
February	312 14	Bacteriological Laboratory	19 90
March	434 16	Physicial "	80 07
April	116 67	Chemical "	97 12
May	294 11	Biological "	24 25
June	177 39	Engineer Dept.	21 29
July	150 13	Excursions	50 32
August	116 96	Massey Buildings	5 07
September	335 15	Farm Dept.	1,236 92
October	810 03	Experimental Dept.	818 37
November	552 52	Dairy Dept.	387 08
December	207 03	Dairy School, Cold Storage, etc.	8 80
		Poultry Dept.	187 64
		Horticultural Dept.	576 60
		Mechanical "	220 29
		Macdonald Institute	2 87
	$ 3,850 31		$ 3,850 31

II. FARM EXPENDITURE.

(*a*) Farm Proper and Experimental Feeding.

1. *Permanent Improvements*		78 13
2. *Maintenance*:		
Wages of foremen and men	3,672 49	
Live stock—Cattle and swine for feeding, etc	4,866 64	
Maintenance of stock	2,049 92	
Seeds	179 30	
Binder twine	72 04	
Repairs, alterations, and blacksmithing	941 97	
Furnishings	31 06	
Tools and implements	282 05	
Advertising, printing, postage, and stationery	289 61	
Fuel and light	19 81	
Experimental feeder	354 00	
Contingencies	354 66	
Purchase of team	500 00	
		$13,613 55
		13,691 68

*Telephone service transferred to Miscellaneous in Auditor's Report.

Farm Revenue.

1. *Sale of Stock:*		
Cattle, 53 head	3,968 79	
Pigs, 232 head	2,483 46	
Sheep and Lambs, 26 head	182 00	
Old horse	50 00	
Experiment sale,—3 carcasses beef, killed for instruction in short course.	245 43	
Miscellaneous Sales:		
Roots,—turnips, etc.	54 75	
Sugar beets	13 67	
Hay	112 50	
Barley for seed	66 10	
Meal	109 50	
Wool	25 38	
Hide	1 80	
Milk	27 75	
Old iron	2 00	
Service of animals	265 00	
		$7,608 13
Net expenditure, allowing nothing for supplies to College, feed for dairy stock, keep of horses for College and other departments		6,083 55

This statement includes only the cash transactions for the year.

(*b*) Field Experiments.

Experimentalist—salary	$1,800 00
Foreman—salary	600 00
Teamsters—wages	533 00
Laborers—wages	2,425 14
Seeds	333 91
Manure	54 70
Furnishings, repairs, blacksmithing, etc.	227 61

(*b*) FIELD EXPERIMENTS.—*Continued.*

Printing, postage, stationery, etc	$ 61 82		
Stenographer	290 00		
Assistant Experimentalist—salary	500 00		
Contingencies	97 85		
Implements	56 83		
Purchase of horse	175 00		
		7,155 86	
Permanent improvements		662 70	
Total expenditure			$7,818 56

III. DAIRY SCHOOL.

EXPENDITURE.

Wages of Instructors		1,737 45	
Engineer		46 50	
Furnishings, repairs and cleaning ; dairy appliances		743 29	
Fuel and light		448 51	
Advertising, printing, postage and stationery		193 29	
Contingencies		128 04	
Milk for use in School		3,668 09	
Travelling expenses		3 50	
*Refrigerator plant (ice machine)		1,222 98	
			8,191 65

REVENUE.

Fees		142 20	
Sales of Butter : 18,455¼ lbs. @ from 18c to 23c		4,025 46	
Sales of Cheese : 7,767½ lbs. @ from 7c to 13c		961 49	
Sales of Skimmilk and Whey		4 55	
Sales of Cream : 8 cts. @ 20c		1 60	
Sales of Milk and Buttermilk : 1,075 qts. @ 4c		43 00	
Sales of Sundries : 3 testers	9 00		
Expenses Prof. Dean	6 00		
		15 00	
			5,193 30
Net expenditure			2,998 35

*Dairy School ice machine, $1,222.98, should not be in the Maintenance Expenditure as it is properly an expenditure on Capital Account.

III. DAIRY DEPARTMENT.

EXPENDITURE.

Foreman (8½ months)		326 10	
Cheesemaker (8½ months)		472 17	
Buttermaker "		328 42	
Cattleman		480 92	
Milk for experiments		8,037 70	
Cows		71 50	
Food and fodder		413 53	
Furnishings and repairs		813 21	
Fuel and light		674 51	
Laboratory expenses, chemicals, etc		107 17	
Contingencies, advertising, printing, postage and stationery		337 24	
Engineer (8½ months)		259 50	
			12,321 9

REVENUE.

Sales of Butter : 33,180½ lbs. @ from 15c to 23c		6,692 68	
Sales of Cheese : 6,442½ lbs. at from 8c to 12c		701 12	
Sales of Milk : 2,474 qts. @ 4c		98 96	
Sales of Skimmilk and Whey		15 08	
Sales of Cream : 62 gal. @ 60c., 1 qt. @ 20c		37 40	
Sales of Fat		89 35	
Sales of Cattle :			
2 bull calves	35 00		
9 grade calves	32 00		
3 cows	122 00		
6 heifers	165 00		
		354 00	
Sale of Treadmill		50 00	
Sale of Rennet		1 10	

DAIRY DEPARTMENT.—*Continued.*

Sale of Separator		$35 00	
Sale of Old Iron		2 00	
Rebate on Ice Machine		14 15	
			$8,090 84
Net expenditure (Allowing nothing for milk or cream supplied to the College)			4,231 13

IV. POULTRY DEPARTMENT.

EXPENDITURE.

Wages of assistant		428 06	
Purchase of stock		53 21	
Furnishings, repairs, etc.		159 67	
Feed, etc		293 27	
Fuel, light and contingencies		283 64	
Experiments in fattening poultry		984 44	
			2,202 29

REVENUE.

Sale of Eggs:			
For hatching—137 sittings	167 40		
For domestic use—688½ doz	114 09		
		281 49	
Sale of Poultry:			
Live birds—224	217 70		
Dressed birds	451 62		
		669 32	
Sale of old bones		1 00	
" *feathers*		1 20	
			953 01
Net expenditure			$1,249 28

Telephone service transferred to Miscellaneous in Auditor's Report.

V. HORTICULTURAL DEPARTMENT.

EXPENDITURE.

Permanent Improvements		748 80	
Maintenance:			
Salary of head gardener and foreman	$749 98		
" assistant " "	600 00		
" " in greenhouses	400 00		
Teamster	390 41		
Wages of laborers	1,893 07		
Manure and fertilizers	74 21		
Seeds, bulbs, plants, trees, etc	209 84		
furnishings, repairs, implements and tools	621 16		
Fuel and light	553 40		
Purchase of horse	190 00		
Contingencies	171 02		
		5,853 09	
			6,601 89

REVENUE.

Sale of 98 baskets strawberries at 5c	4 90		
" *cut greens, etc.*	65		
			5 55
Net expenditure			6,596 34

Ordinarily there is no revenue from this department, as the produce is used by the College.

VI. MECHANICAL DEPARTMENT.

Salary of foreman	$750 00		
Tools, fuel, and light	147 26		
		$ 897 26	

TOTAL NET EXPENDITURE ON MAINTENANCE ACCOUNT: $87,806 64

S. SPRINGER,
Bursar.

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